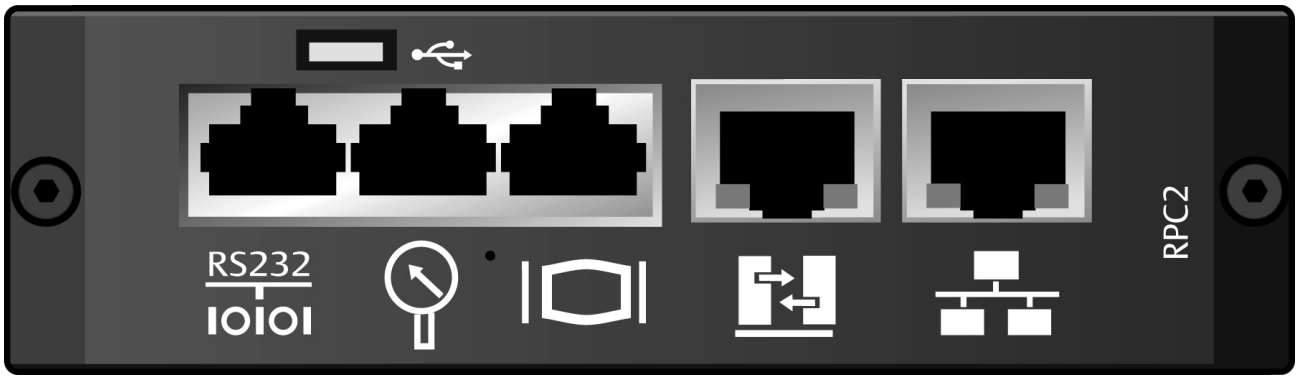
RPC2™ Communications Module

User Manual - Network Interface card for the Rack PDU family of power distribution products



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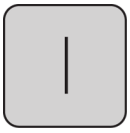
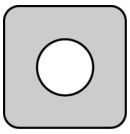
SYMBOLS USED

The following symbols may appear in the documentation or on the product.

Table 1 Symbols on RPC2 communications module and documentation

Symbol	Meaning
	High Temperature Alerts the user where the enclosure temperature may exceed 158°F (70°C) while operating under high-ambient temperature and at maximally rated load.
	Instructions Signifies the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.
	Dangerous Voltage Warns about the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	**Power On** Indicates the principal On/Off switch is in the On position.
	**Power Off** Indicates the principal On/Off switch is in the Off position.
	Protective Grounding Terminal Indicates a terminal that must be connected to earth ground before any other connections to the equipment may be made.

1.0 INTRODUCTION

The RPC2 communications module is a network interface module that provides network connectivity to the Liebert® rack PDU family of products.

The RPC2 (Rack PDU card) is factory-installed installed in managed versions of Emerson Network Power's MPH2™ Rack PDU's. It can be field-installed in Liebert MPH™ and Liebert MPX™ rack PDU's to provide network monitoring and control capabilities.

The module is factory-set for service in DHCP-based applications. It can be quickly and simply configured for duty in static IP applications.

The RPC2 serves as the integration point for several rack accessory products. Available options include a handheld display, the RPC BDM, to view monitoring data and Liebert SN™ sensors that may be connected to monitor temperature, humidity, door contacts and digital inputs.

1.1 Features and Benefits

Interoperability

The RPC2 communications module integrates network management of the MPH rack PDU family and environmental sensors with a local display interface. This ensures consistency of information available to both remote and local users — those in the data center — thus reducing mistakes during commission/decommission.

Cable Standardization

The RPC2 communications module uses standard cables that are readily available in a data center; no special cables are required. The LAN port is compatible with 1Gbps Ethernet speeds with the recommended CAT5E or CAT6 Ethernet cabling. The USB port connection uses standard USB cabling.

Consolidation of IP Addresses

The RPC2 communications module can be used to create a Rack PDU Array™ by interconnecting multiple MPH2 Rack PDUs to minimize the number of IP addresses, consolidate monitoring and reduce overhead.

Receptacle Group Control

The RPC2 communications module enables grouping receptacles to apply the same action to all receptacles in the group with one operation. It also permits monitoring and management of receptacle groups through Liebert Nform™ software.

MPH2 Rack PDU Power Conditioning Monitoring

The RPC2 communications module enables monitoring of Emerson's MPH2, Liebert MPX and Liebert MPH rack PDU's collectively known as Liebert and Emerson Network Power rack PDU. It provides rack PDU receptacle voltage and current draw, provides load balancing capability and monitors rack environmental conditions.

Energy Metering

The RPC2 communications module reports power consumption (kWh) at the PDU, branch and receptacle levels as calculated by the MPH2's circuitry.

Receptacle Load Control

The RPC2 communications module interface permits controlling the power-up / wake-up state and sequencing of receptacles.

Local Display Support

The RPC2 communications module provides an interface for a display option, the RPC BDM, to facilitate installation and local troubleshooting of interconnected MPH rack PDUs. The display may be user-mounted on or near racks for optimal placement and viewing.

Event Notifications

The RPC2 communications module sends comprehensive event notifications via SNMP, e-mail, SMS text messages and cellular paging. It also provides notification status via a Web page.

MPH2 Rack PDU Management

A user can use the RPC2 communications module to interact with a rack PDU by referencing the user-assigned receptacle labels or loads.

Wide Range of IT Network Capabilities

The RPC2 communications module provides a flexible set of IT networking capabilities, including DHCP, BOOTP, DNS, SNTP and SNMP.

Hot Swappable

The RPC2 communications module may be removed and reinserted without interrupting power from the rack PDU or affecting the connected load.

Flash Upgradeable Firmware

The RPC2 communications module enables the user to easily update the firmware as new features and capabilities become available.

Web Support

The RPC2 communications module delivers Web management and control to Liebert and Emerson rack PDU's. All authorized users will be able to view status information on their network.

SNMP Support

The RPC2 communications module enables SNMP management of Liebert and Emerson rack PDU's. To integrate the card into an SNMP implementation, compile the Liebert® Global Products MIB on the Network Management System (NMS).

The Liebert Global Products MIB can be downloaded from: **www.liebert.com**

Liebert Nform®

Utilizing the SNMP and Web technologies built into the RPC2 communications module, Liebert Nform will centrally manage event notifications, access critical system information and manage the power delivered to the connected load.

A downloadable edition is available online at: **nform.liebert.com**

Liebert SiteScan Web®

The RPC2 communications module integrates with Liebert SiteScan Web software to monitor and analyze trends to ensure high availability operation of critical facilities. For more information on Liebert SiteScan Web, visit the Web page at: **sitescan.liebert.com**

Monitoring and Configuration Overview

Liebert and Emerson rack PDU's are managed at three levels:

- At the rack PDU level, it provides aggregate input power monitoring of the rack PDU.
- At the branch level, it provides status information, including branch circuit breaker on some models, and aggregate power monitoring of branch receptacles.
- At the receptacle level, it provides status information and power monitoring of a single receptacle on some models.

1.2 Ports on the RPC2

The module has six ports designated by icons (see **Figure 1**). Connect an Ethernet cable (not included) to the Network port. Connect that cable to the network.

Figure 1 RPC2 communications module ports

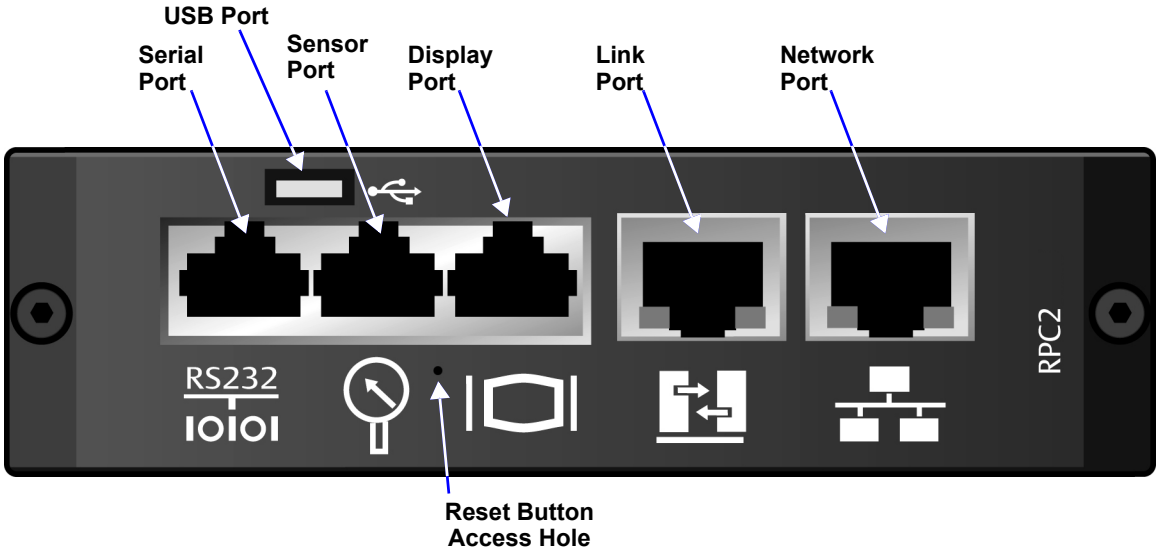


Table 2 RPC2 communications module port icons

Icon	Name	Purpose	For details, refer to Section:
RS232	Serial Port	• Use this port for RS-232 serial communication using Command Line Interface (CLI)	—
	USB Port	• Future Applications	—
	SensorPort	• Use this port **ONLY** to plug in optional sensor accessories.	**6.0 - Liebert SN™ Sensor Installation (Optional)**
	Display Port	• Use this port **ONLY** to plug in the RPC BDM (Basic Display Module).	**5.2 - RPC BDM™ Installation**
	Link Port	Use this port **ONLY** for:	
		• Local configuration through interconnection to a computer	**2.2 - Field-Installation of an RPC2 Communications Module**
		• Creating a Rack PDU Array by interconnecting additional rack PDUs	**2.5 - Create a Rack PDU Array™**
	Network Port	Use this port **ONLY** to:	
		• Plug in the Local Area Network (LAN) via an Ethernet cable (not included).	**2.2 - Field-Installation of an RPC2 Communications Module**
		• Create a Rack PDU Array™ by interconnecting additional rack PDUs	**2.5 - Create a Rack PDU Array™**

2.0 INSTALLATION

2.1 Getting Started

The RPC2 communications module should be factory-installed on Liebert and Emerson Network Power® rack PDU's. If it is being field-installed, refer to **2.1.1 - RPC2 Communications Module Kit Contents** and **2.1.2 - Required Cables** to be sure to have all items necessary for proper installation.

Figure 2 RPC2 communications module in an MPH2

2.1.1 RPC2 Communications Module Kit Contents

- RPC2 communications module
- User guide, also available for download at **www.emerson.com**

2.1.2 Required Cables

These cables are not included but are necessary for RPC2 communications module functionality.

- RJ-45 cable for connection to the Serial port
- RJ-45 CAT5E or CAT6 Ethernet cable for the Network Port connection
- RJ-45 CAT5 or better Ethernet cable for the Link port connection

NOTE
Liebert 1-wire sensors and the local display, the RPC BDM, come with their own cables.

2.2 Field-Installation of an RPC2 Communications Module

Locate the communications card bay on the rack PDU and insert the RPC2 communications module into the card bay. Secure it with the provided screws.

2.3 Configure an RPC2 Communications Module for Static IP

The RPC2 communications module is factory-set for DHCP, making it ready for service immediately. The module can be configured for operation on a network using static IP or BootP.

To configure a module for a network that uses static IP:

1. Insert an additional Ethernet cable (not included) into the module's Link port (see **Figure 1** for the port location).

NOTE
The card's Link port should be used only for local configuration through interconnection to a laptop. Do not connect the cable from the Link port to your company LAN, to an Ethernet network or to similar a network.

2. Insert the other end of the Ethernet cable into a laptop.
3. Configure the laptop's IP settings to communicate on a 192.168.1.X network.
   - IP address: 192.168.1.9
   - Subnet mask: 255.255.255.252
   - Default gateway: 192.168.1.1
4. Open a Web browser to enter the IP address of the Link Port.

NOTE
RPC2 communications module configures sibling connections automatically but must be rebooted if the connection order is changed. For information about sibling connections, refer to ***2.5 - Create a Rack PDU Array™***.

5. When prompted for a username and password, enter the default login and password—*admin* for both (case-sensitive)—and click the Login icon or press the enter key.
6. Click the System tab, then click **Settings>Network** in the navigation tree.
7. Click the **Edit** icon in the right pane .
8. The default Speed/Duplex for the Ethernet port is Auto 1000 Mbs/Full Duplex (automatic). To change this, choose from the Speed/Duplex drop-down list.
9. Choose the IPV4 Boot Mode: Static or DHCP. (The default is DHCP.)
10. Click the **Save** icon, ✔, to save the change or click the **Cancel** icon to cancel the change.
11. Configure the IP Address, Subnet Mask and Default Gateway in the System tab; see your network administrator for these settings.
12. To complete the configuration, click the **Reboot** icon in System tab>**Settings**.

Use **Table 3** to make changes to the cards in the array using the Link port.

Table 3 Laptop IP settings for RPC module addresses

IP Address	Rack PDU 1	Rack PDU 2	Rack PDU 3	Rack PDU 4
Laptop Computer	192.168.1.9	192.168.1.5	192.168.1.1	192.168.1.13
Link Port	192.168.1.10	192.168.1.6	192.168.1.2	192.168.1.14
Subnet Mask	255.255.255.252	255.255.255.252	255.255.255.252	255.255.255.252

2.4 User Level Privileges

The RPC2 communications module permits four user levels:

- Administrator—can configure and control all rack PDU's in the system
- Power User—can configure rack PDU's; no receptacle control
- Appliance—can view rack PDU's; no configuration or control
- User—can view rack PDU's specified by administrator; no receptacle control

Because of the varying authorization levels, the user interface's appearance will be different for each level of user. For details on user levels, see **4.8.7 - Authorization Levels**.

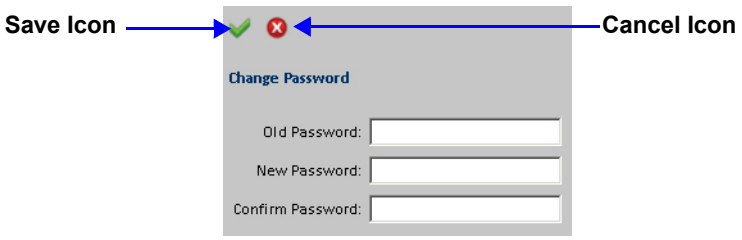
Access to the RPC2 communications module requires entering a password. The default administrator level user name and password is *admin*. Each is case-sensitive. Emerson Network Power recommends changing the password immediately to prevent unauthorized access to MPH2 rack PDU's.

2.4.1 Group Membership and Access

Adding a user to a default group automatically sets the user's access. For example, adding a user to the Appliance group permits that user to view rack PDU's to determine the units' status, but Appliance group users cannot configure or control a rack PDU.

2.4.2 Change Administrator's Password

1. Open a Web browser and enter the IP address of the RPC2 communications module.
2. Log in with the default username *admin* and the default password *admin*.
3. Click on the System tab > **Authorization > Change Password**
4. Enter the new user name.
5. Enter the new password.
6. Confirm the new password.
7. Click on the **Save** icon, ✔, at the top of the screen to make the change or click the **Cancel** icon to discard the change.



2.5 Create a Rack PDU Array™

Up to four MPH2 or Liebert MPX rack PDU's may be integrated into a Rack PDU Array, which permits central control and monitoring of each rack PDU through a single Web interface. Each rack PDU must have an RPC2 communications module installed.

NOTE
Creating a Rack PDU Array does not require powering down either the MPH2 rack PDUs or the connected load.

The level of monitoring and control depends on the type of MPH2. MPH2 rack PDU's with management function permit monitoring and control of either groups of receptacles or individual receptacles.

To set up a Rack PDU Array:

1. Log in with the privileges required to change these settings.
2. Insert an Ethernet cable connected to a computer or network switch into the Network port of the RPC2 communications module that will serve as the master unit.
3. Insert an Ethernet cable into the Link port of the RPC2 communications module that will serve as the master unit.
4. Insert the other end of the Ethernet cable into the Network Port of an RPC2 communications module on a second MPH2; this RPC2 will be a sibling unit, accessible through the master RPC2. Any of the RPC2 communications modules in the array may be designated as the master unit (see **Figure 3** for an example).
5. Reboot the RPC2 communications module in the sibling MPH2 rack PDU.
   a. Insert a paper clip end or stiff wire of similar size into the hole between the Display Port symbol and the Sensor Port symbol (see **Figure 1** for the location).
   b. Press the reset button and hold it firmly for at least 2 seconds.
6. The second RPC2 communications module will automatically detect the connections and reboot as a sibling unit.

NOTE
Rebooting the RPC2 communications module causes no interruption of output power from the MPH2 rack PDU.

7. Connect additional RPC2 communications modules as shown in **Figure 3**; the Ethernet cable will attach from the Link Port of an RPC2 that has been added to the array to the next module's Network Port.
8. Reboot each RPC2 after connection.

Figure 3 Rack PDU Array layout examples

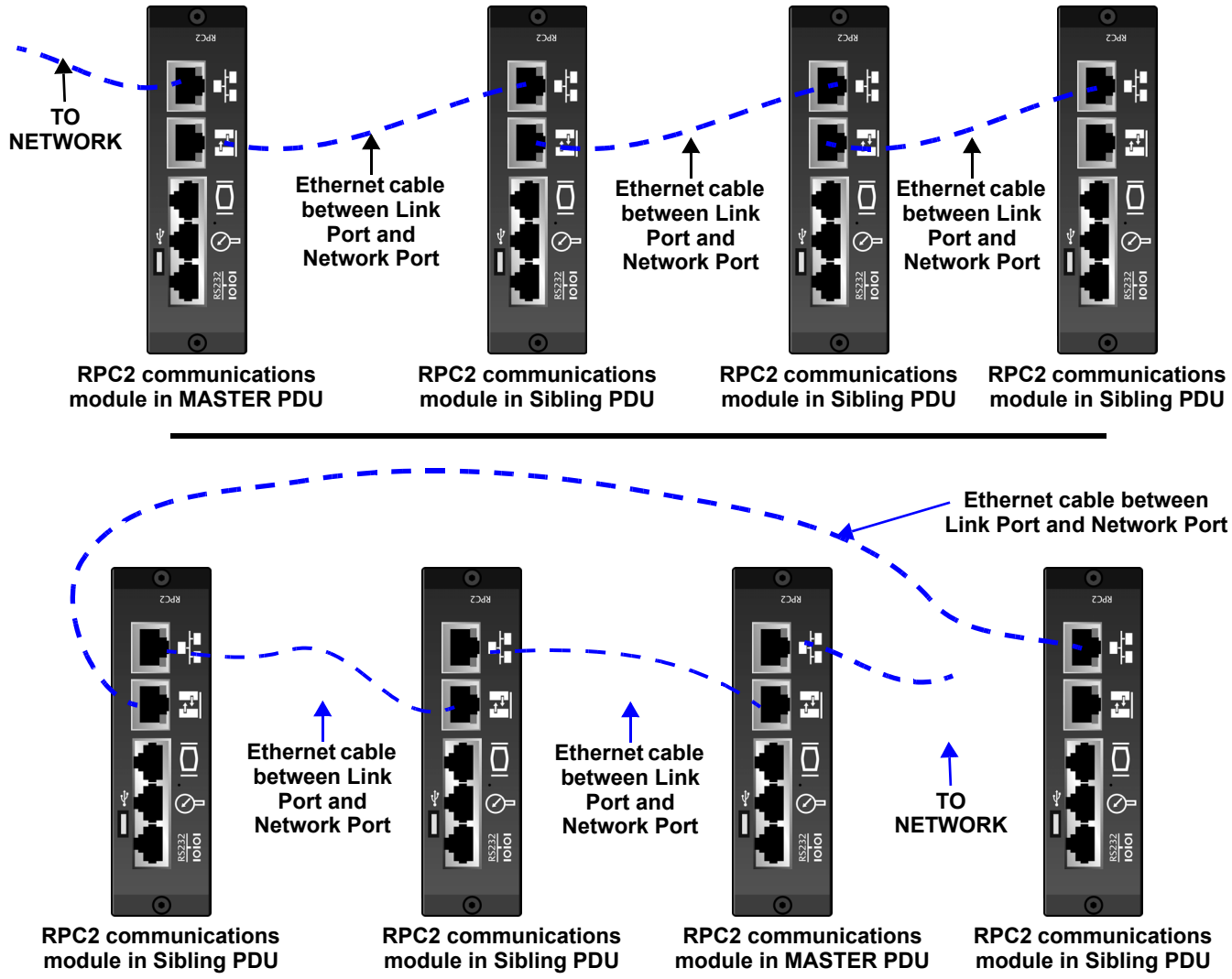

TO NETWORK
Ethernet cable between Link Port and Network Port
Ethernet cable between Link Port and Network Port
Ethernet cable between Link Port and Network Port
RPC2 communications module in MASTER PDU
RPC2 communications module in Sibling PDU
RPC2 communications module in Sibling PDU
RPC2 communications module in Sibling PDU
Ethernet cable between Link Port and Network Port
Ethernet cable between Link Port and Network Port
Ethernet cable between Link Port and Network Port
TO NETWORK
RPC2 communications module in Sibling PDU
RPC2 communications module in Sibling PDU
RPC2 communications module in MASTER PDU
RPC2 communications module in Sibling PDU

Table 4 IP addresses in a Rack PDU Array™

IP Address	Rack PDU 1	Rack PDU 2	Rack PDU 3	Rack PDU 4
Link Port	192.168.1.10	192.168.1.6	192.168.1.2	192.168.1.14
Network Port	User Determined	192.168.1.9	192.168.1.5	192.168.1.1
Subnet Mask	255.255.255.252	255.255.255.252	255.255.255.252	255.255.255.252

Table 5 Laptop IP settings for RPC2 communications module addresses

IP Address	Rack PDU 1	Rack PDU 2	Rack PDU 3	Rack PDU 4
Laptop Computer	192.168.1.9	192.168.1.5	192.168.1.1	192.168.1.13
Link Port	192.168.1.10	192.168.1.6	192.168.1.2	192.168.1.14
Subnet Mask	255.255.255.252	255.255.255.252	255.255.255.252	255.255.255.252

3.0 MONITORING AND CONFIGURATION OVERVIEW

3.1 Liebert Rack PDU Monitoring Structure

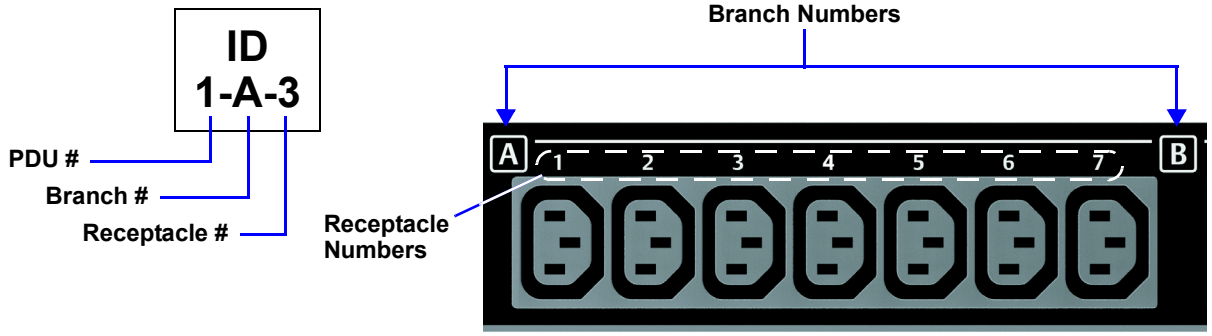
Liebert Rack PDUs are managed at three levels:

- **Rack PDU Level**—provides aggregate input power monitoring of rack PDU's
- **Branch Level**—provides status information of a branch circuit breaker and aggregate power monitoring of branch receptacles
- **Receptacle Level**—provides status information and power monitoring of a single receptacle (available on certain models of MPH2 and Liebert MPX™)

3.2 Rack PDU Component ID

An alphanumeric ID consisting of up to three parts helps users identify components when displayed on the Web interface or the RPC BDM display unit (see **3.2 - Rack PDU Component ID**). The branch and receptacles on an MPH2 are numbered.

The component ID uses the format ***PDU# - Branch# - Receptacle#***. As the following example shows, the component ID ***1-A-3*** identifies ***Receptacle #3 on Branch A of PDU #1***.



- A **PDU** is identified by a number designating its interconnected position in a Rack PDU Array, from 1 to 4; the default is 1. Up to four PDUs can be interconnected.

  For example, "**1**" indicates ***PDU #1***.

NOTE

The PDU number will automatically update in the Web interface, but the number shown in the MPH2's onboard LCD will always be 1. The onboard LCD shows information only about the MPH2 where it is installed.

- A **branch** is identified by the PDU where it is attached (for example, PDU #1), followed by a letter designation of the branch's location on the PDU.

  For example, "**1-A**" indicates ***Branch A on PDU #1***.
- A **receptacle** is identified by the PDU and branch where it is attached (for example, PDU #1, Branch A), followed by a numeric designation of the receptacle's location on the branch.

  For example, "**1-A-3**" indicates ***Receptacle #3 on Branch A of PDU #1***.

3.3 Liebert Rack PDU Viewing and Browsing

This manual covers the following methods of viewing and browsing information on a Liebert Rack PDU. Control functions are available via the Web interface but not with the RPC BDM.

Method	Monitoring	Control	Configuration	For details, refer to:
Summary	✔	—	—	**3.3.1 - Summary Tab** **4.2 - Summary Tab**
PDU Explorer™	✔	✔	✔	**3.3.2 - PDU Explorer Overview** **4.3 - PDU Explorer Tab**
Device Explorer™	✔	✔	—	**3.3.3 - Device Explorer Overview** **4.6 - Device Explorer**
Events Tab	✔	—	—	**3.3.4 - Events Tab Overview** **4.7 - Events Tab**
System Tab	—	—	✔	**3.3.5 - System Tab Overview** **4.8 - System Tab**
RPC BDM display unit	✔	—	—	**3.3.6 - RPC BDM Overview** **5.0 - RPC BDM™ (Optional)**

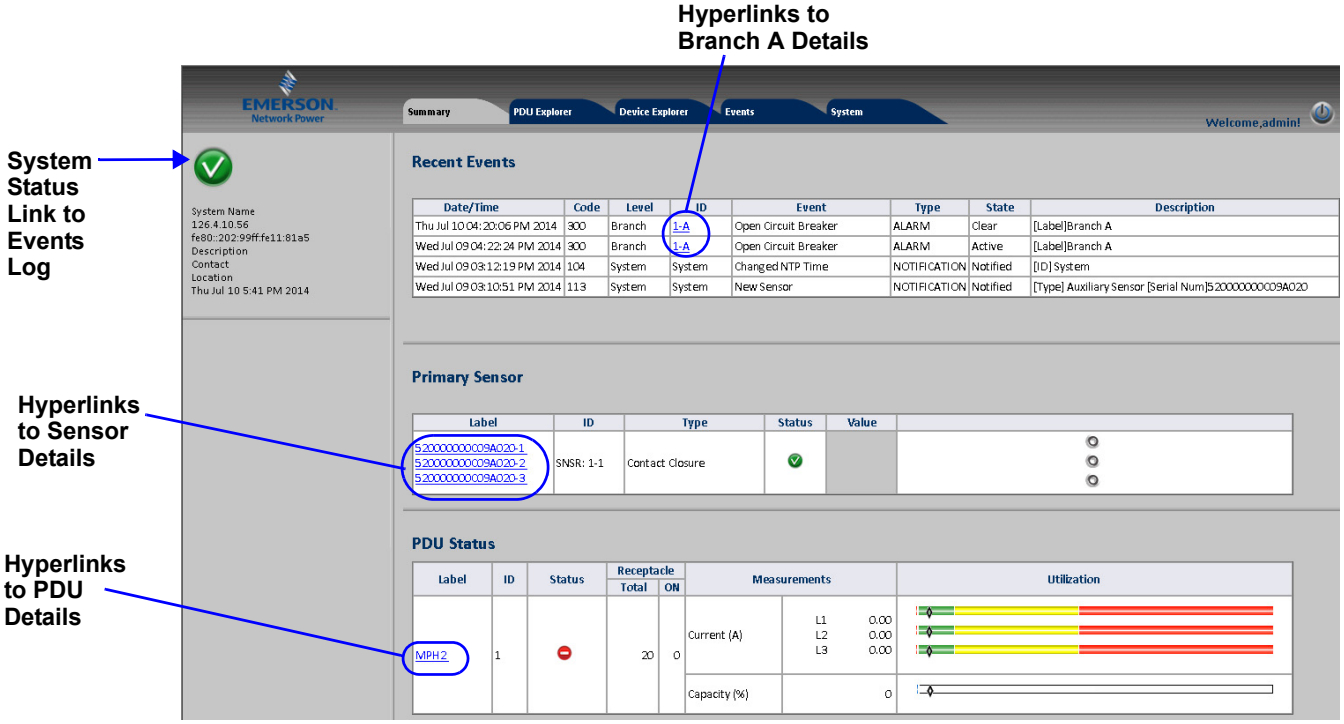
3.3.1 Summary Tab

The Summary tab displays aggregate information about the MPH2's status, including:

- Recent Events
- Primary Sensor and
- PDU Status

Hyperlinks in each portion of the Summary tab window shifts the view to more detailed information.. In **Figure 4**, for example, the Recent Events information has hyperlinks that open the PDU Explorer to Branch A.

Figure 4 Summary Tab components



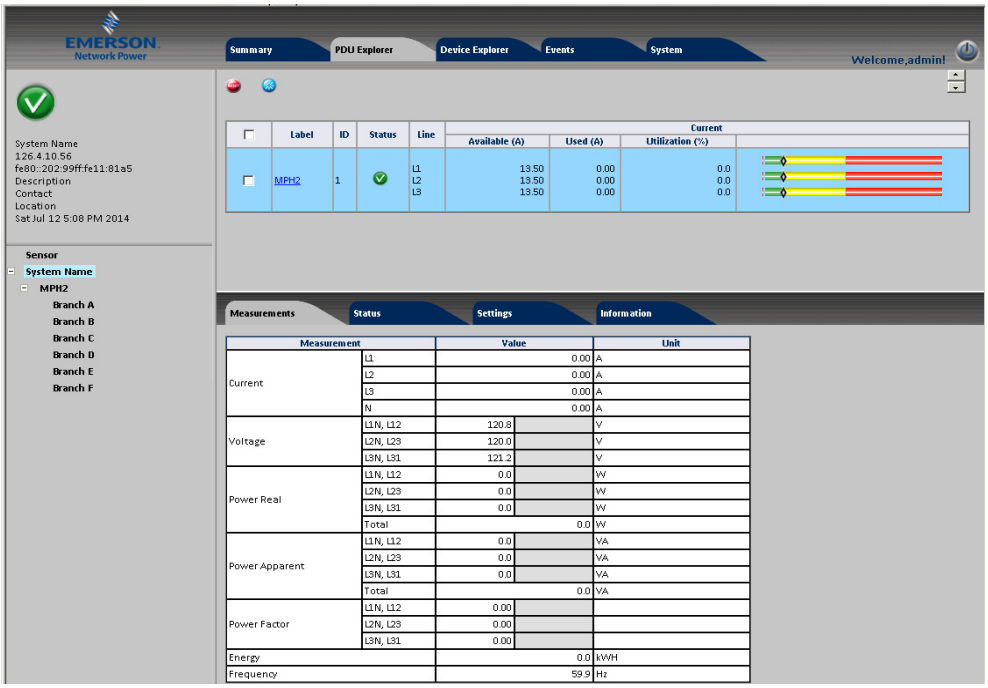
3.3.2 PDU Explorer Overview

PDU Explorer is Web-based software that displays a hierarchical view of the system. The PDU Explorer permits browsing components starting at the PDU level, through to the branches of the PDU, and down to the receptacles of those branches. See **4.0 - Accessing an RPC2 Communications Module via the Web Interface** for details on using PDU Explorer.

The available information depends on the type of MPH2; units that do not have branch or receptacle management will not have information about those components (see **Table 6**).

The PDU Explorer home screen shows the System level. The tabs in the lower half of the screen change depending on the level selected. When the Sensor level is selected in the navigation tree, for instance, the Measurements tab is not shown.

Figure 5 The PDU Explorer home screen

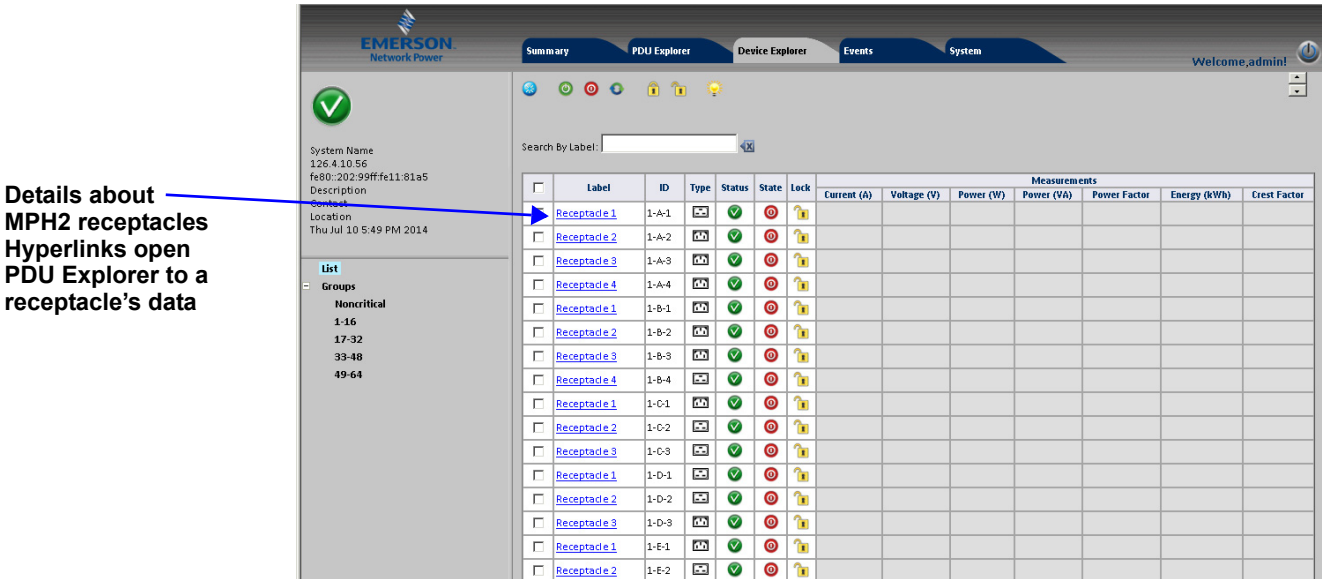


3.3.3 Device Explorer Overview

Device Explorer is Web-based software that displays the user-assigned labels (names) of each receptacle to provide a load-centric method to access status and metering information about the associated load or connected device. To view information on a specific PDU, see **4.0 - Accessing an RPC2 Communications Module via the Web Interface** for detailed information on using Device Explorer.

The RPC2 communications module presents only available data. If the MPH2 does not have branch and receptacle management, the RPC2 will display grayed-out entries and that information will not be shown (see **Table 6**).

Figure 6 Device Explorer screen

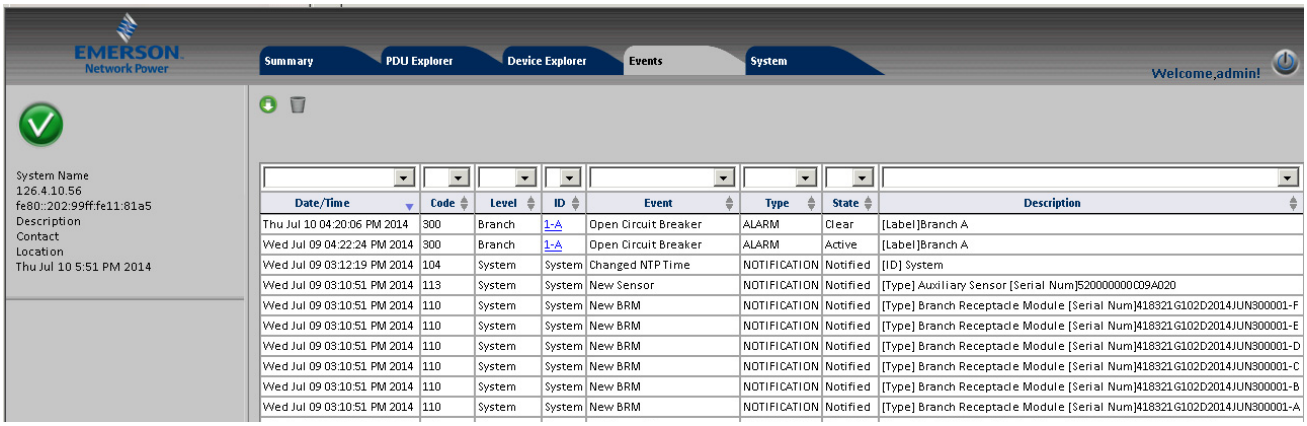


3.3.4 Events Tab Overview

The Events tab lists events that have occurred on the MPH2 system, with more recent events at the top of the list. When the number of events exceeds the limit of 1024, the oldest events are removed first.

Information available includes the date and time of occurrence, the event code, receptacle or branch where the event occurred, name or description of the event, severity level and the event status (active, notification sent, clear, etc.).

Figure 7 Events Tab screen

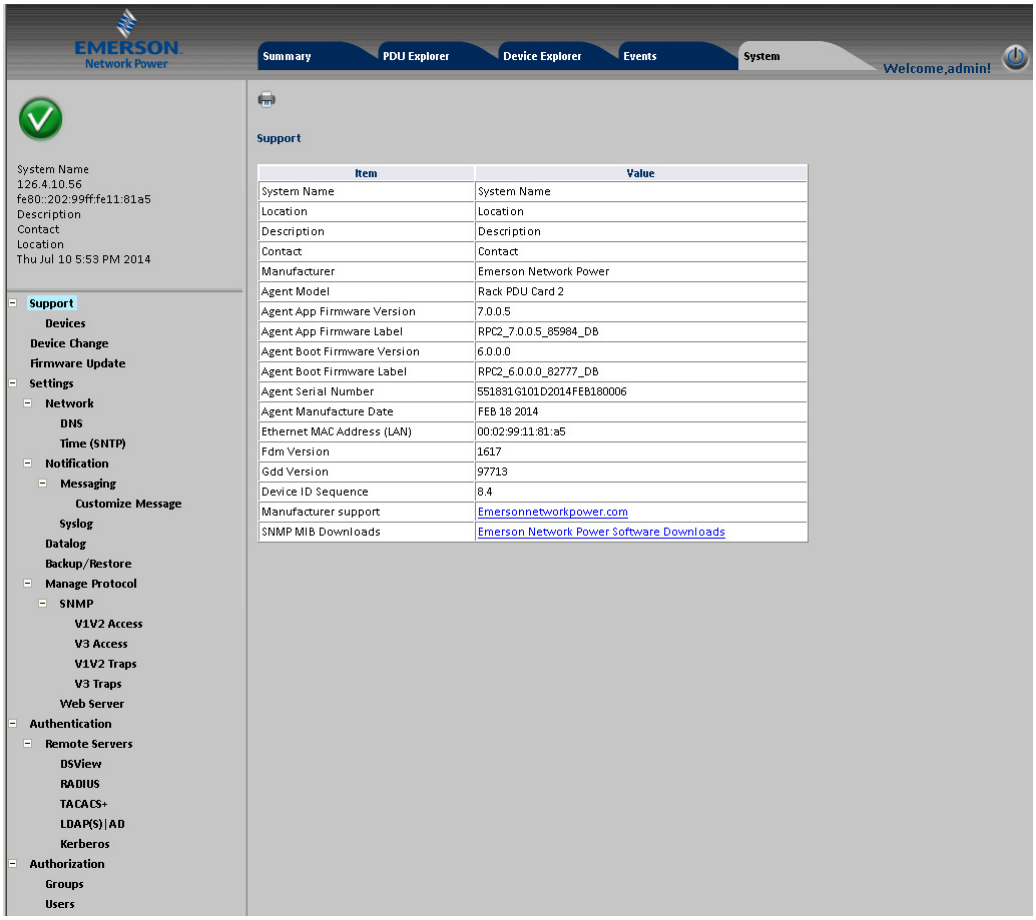

EMERSON Network Power
Summary
PDU Explorer
Device Explorer
Events
System
Welcome,admin!
System Name
126.4.10.56
fe80::202:99ff:fe11:81a5
Description
Contact
Location
Thu Jul 10 5:51 PM 2014
Date/Time
Code
Level
ID
Event
Type
State
Description
Thu Jul 10 04:20:06 PM 2014 300 Branch 1-A Open Circuit Breaker ALARM Clear [Label]Branch A
Wed Jul 09 04:22:24 PM 2014 300 Branch 1-A Open Circuit Breaker ALARM Active [Label]Branch A
Wed Jul 09 03:12:19 PM 2014 104 System System Changed NTP Time NOTIFICATION Notified [ID] System
Wed Jul 09 03:10:51 PM 2014 113 System System New Sensor NOTIFICATION Notified [Type] Auxiliary Sensor [Serial Num]520000000C09A020
Wed Jul 09 03:10:51 PM 2014 110 System System New BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G102D2014JUN300001-F
Wed Jul 09 03:10:51 PM 2014 110 System System New BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G102D2014JUN300001-E
Wed Jul 09 03:10:51 PM 2014 110 System System New BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G102D2014JUN300001-D
Wed Jul 09 03:10:51 PM 2014 110 System System New BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G102D2014JUN300001-C
Wed Jul 09 03:10:51 PM 2014 110 System System New BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G102D2014JUN300001-B
Wed Jul 09 03:10:51 PM 2014 110 System System New BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G102D2014JUN300001-A

3.3.5 System Tab Overview

The System tab is the control and configuration center for the RPC2 rack communications module. Pages on the tab permit updatinge firmware, joining networks, setting security levels, adding and removing users, setting access privileges and alarm threshholds and setting automatic messages for events and alarms (see **Figure 8**).

The tab also displays information about the RPC2 communications module and the PDU where it is installed, including location, contact personnel, technical support, firmware version, serial number and MAC address.

Figure 8 System Tab screen



3.3.6 RPC BDM Overview

The RPC BDM display may be attached with an Ethernet cable to the RPC2 and mounted outside the rack allowing the user to locally view PDU, branch and receptacle information. See **5.0 - RPC BDM™ (Optional)** for a detailed description of its functions. It may also be carried by monitoring personnel and used as a handheld viewing screen that is more easily viewed than an onboard LCD screen.

Figure 9 RPC BDM displaying receptacle information

4.0 Accessing an RPC2 Communications Module via the Web Interface

Emerson's RPC2 communications module can be accessed with a Web browser once it is connected to a network. The browser obtains direct access to the RPC2 communications module via a graphical user interface. The data and appearance will vary according to the types of Liebert or Emerson rack PDU being viewed through the RPC2 communications module.

Table 6 Data or control available in MPH2 models

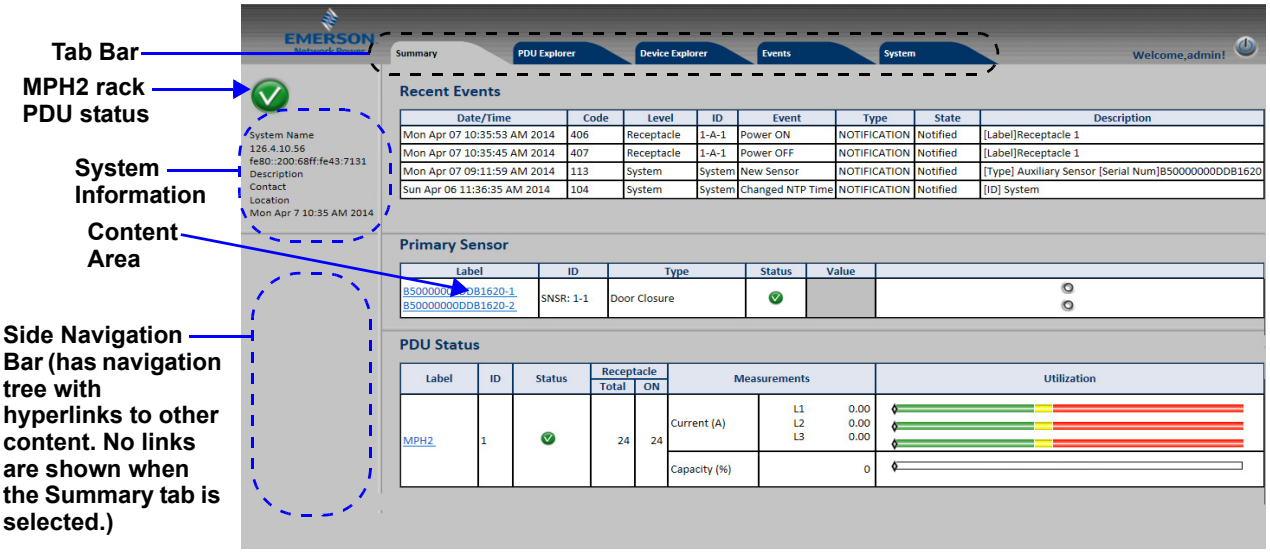
Available Data/Control	MPH2 Type			
	R	M	C	B
Input Measurement	✔	✔	✔	✔
Branch Measurement	✔	✔	✔	✔
Receptacle Measurement	✔	✔	X	X
Receptacle Control	✔	X	✔	X

4.1 Web Interface Overview for Administrators

To log in to the Web interface:

1. Open a Web browser and enter the rack PDU's IP address in the browser's address field.
2. Enter your user name and password.
3. Press the **Enter** button. The Web interface opens automatically to the **Summary** tab.

Figure 10 Web interface overview screen



- **Tab Bar**—Displays the Summary, PDU Explorer, Device Explorer, Events and Systems tabs.
- **Side Navigation Bar**—Menu options for configuration, viewing of system information and access to devices. The options change based on user rights. When the Summary tab is selected, as in **Figure 10**, the Side Navigation Bar shows system information; when other tabs (PDU Explorer, Device Explorer, Events and System) are selected, the area shows a navigation tree with hyperlinks to additional content.
- **Content Area**—Content changes based on the options selected in the Side Navigation Bar.

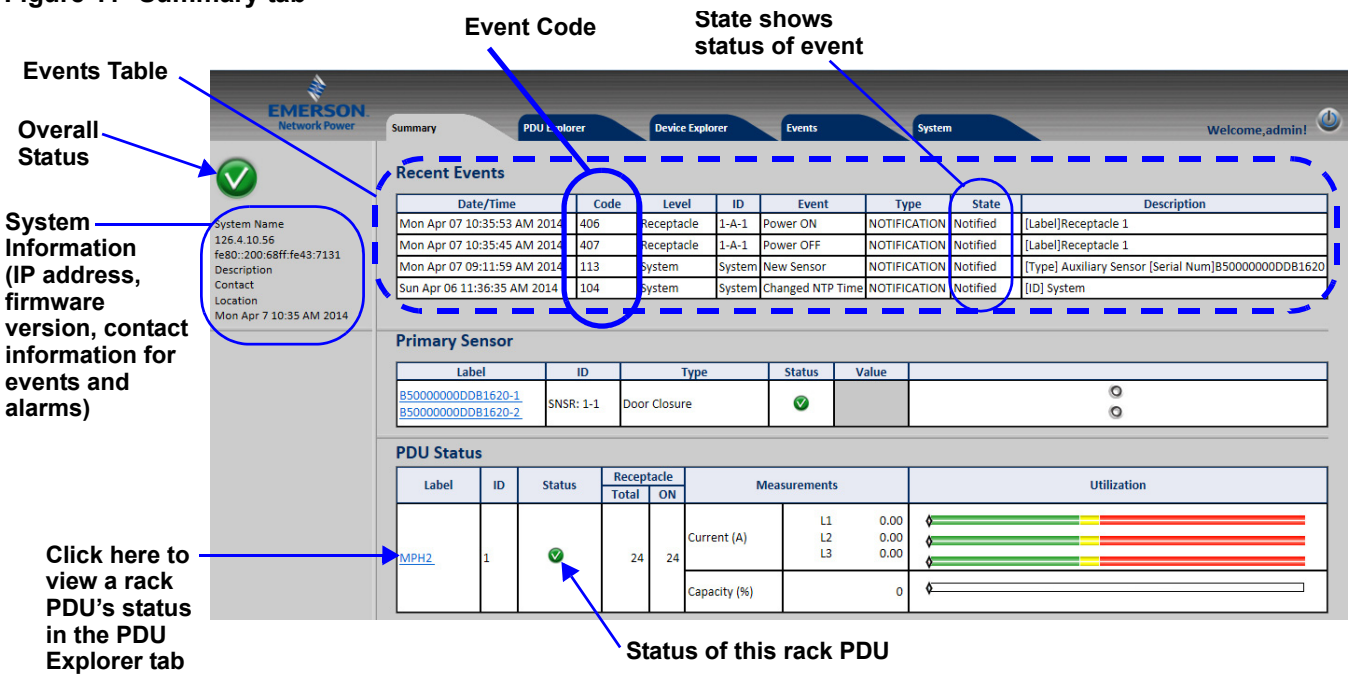
4.2 Summary Tab

Click the Summary tab (**Figure 11**) to view recent events as well as rack PDU status information. This tab gives access to a rack PDU's ID, status, number of receptacles and how many are turned On as well as measurements and utilization information. Click on a rack PDU under the **PDU Status** heading to open it in the PDU Explorer tab (refer to **4.3 - PDU Explorer Tab** for more information).

Events information include:

- Date/Time: Date and time of occurrence
- Code—Identifier for troubleshooting
  - 100-113—System level events
  - 200-207—PDU level events
  - 300-305—Branch level events
  - 400-407—Receptacle level events
  - 500-512—Sensor level events
- Level—Where event occurred: Receptacle, Branch, System
- ID—Identifying information of where event occurred
- Event—Severity of Event: Notification, Warning or Alarm
- State—Whether event notification has been sent (notified); for alarms, either active or cleared
- Description—Information about the event

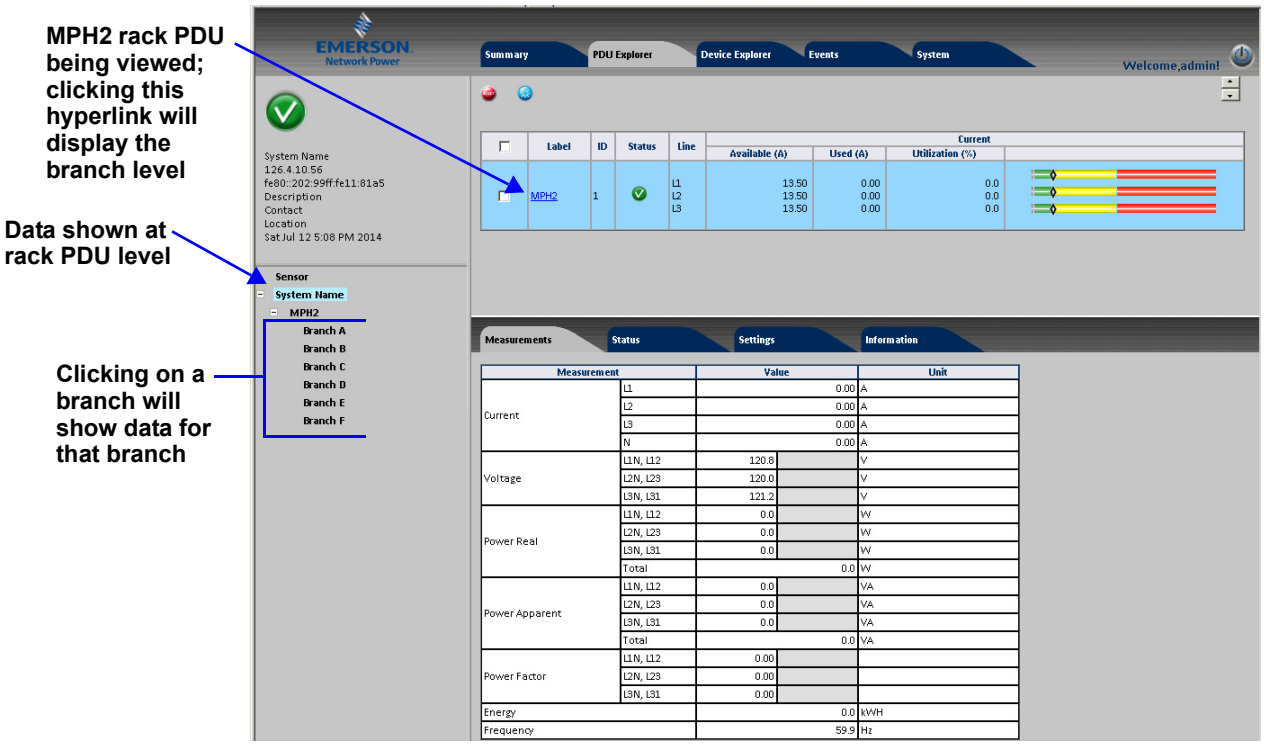
Figure 11 Summary tab



4.3 PDU Explorer Tab

The PDU Explorer displays data from connected equipment, starting with the rack PDU view at the highest level, allowing users to browse down one level to view branches, then another to view the receptacles. It also permits viewing sensors and editing sensor settings.

Figure 12 PDU Explorer main page



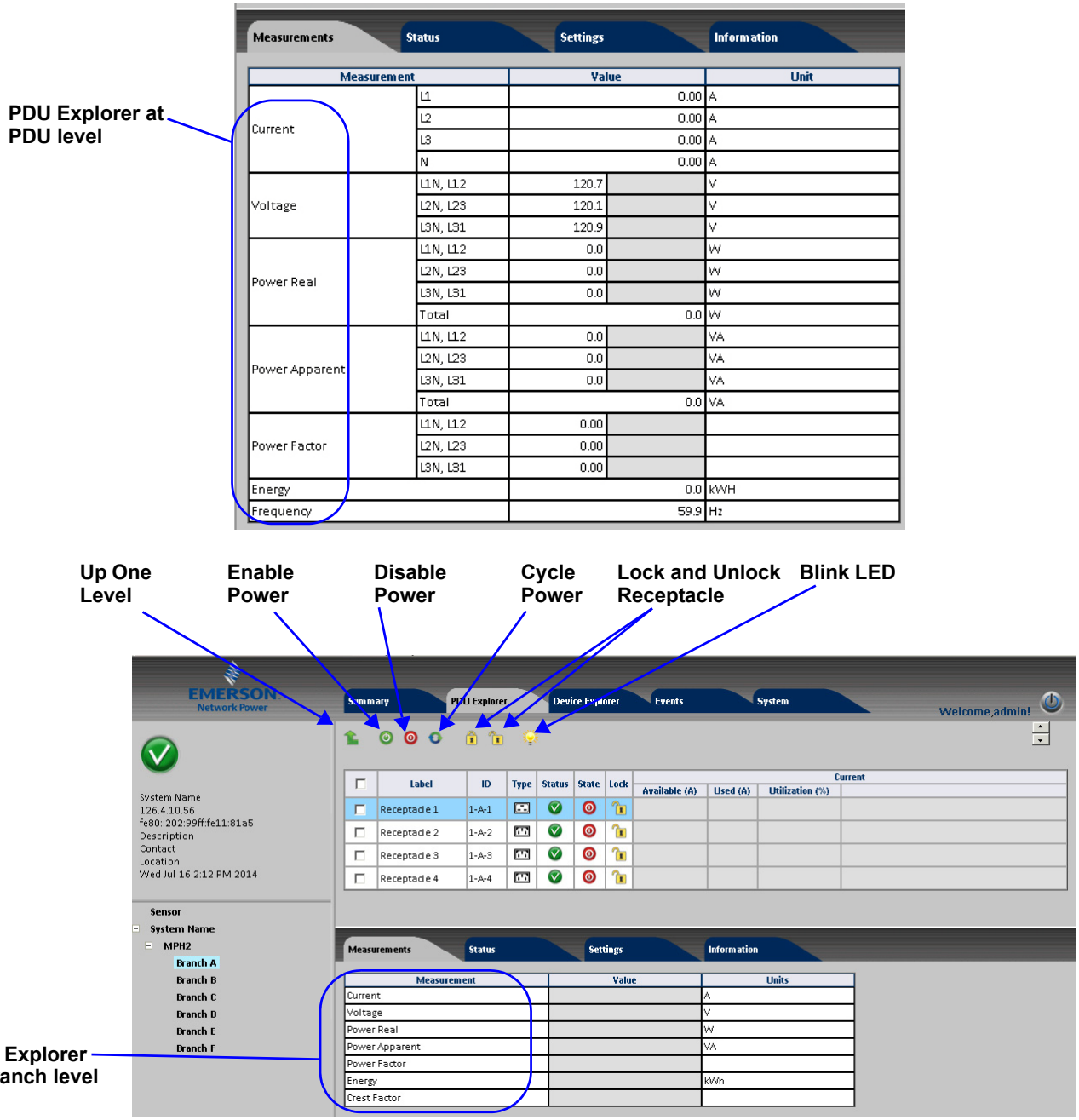
The PDU Explorer main page shows available information about the MPH2 on the lower tabs: Measurement (shown at the main page), Status, Settings and Information.

The Measurements tab displays the rack PDU's current, voltage, power, energy and frequency information. The Status tab displays whether the rack PDU is within acceptable limits for overcurrent, low current and low voltage thresholds. The Information tab displays general information about the rack PDU. Settings on the rack PDU can be edited under the Settings tab.

4.3.1 PDU Explorer Tabs: Measurements

The PDU Explorer's Measurements tab presents available data about the rack PDU. At the system level and PDU level, the page permits resetting energy for the PDU or for a branch. At the branch level, the page permits turning power On or Off to a branch or receptacles, locking and unlocking a branch or receptacles and causing a receptacle's LED to blink.

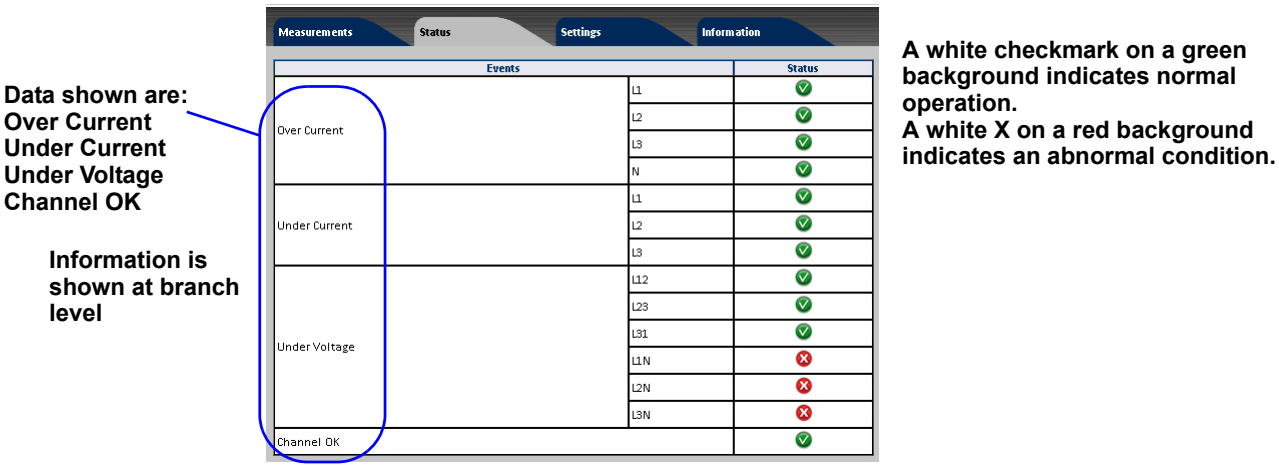
Figure 13 PDU Explorer tabs: Measurements



4.3.2 PDU Explorer Tabs: Status

The PDU Explorer's Status tab presents the condition of the MPH2. **Figure 14** shows data for a monitored and managed MPH2 rack PDU.

Figure 14 PDU Explorer tabs: Status



4.3.3 PDU Explorer Tabs: Settings

The PDU Explorer's Settings tab permits entering a customized name for a PDU or receptacle, setting how long the PDU delays before power is available to a receptacle at startup, setting whether a receptacle is critical, adjusting the threshold for alarms and other events, locking or unlocking receptacles and performing other functions as shown in **Figure 15**. To edit a rack PDU's settings:

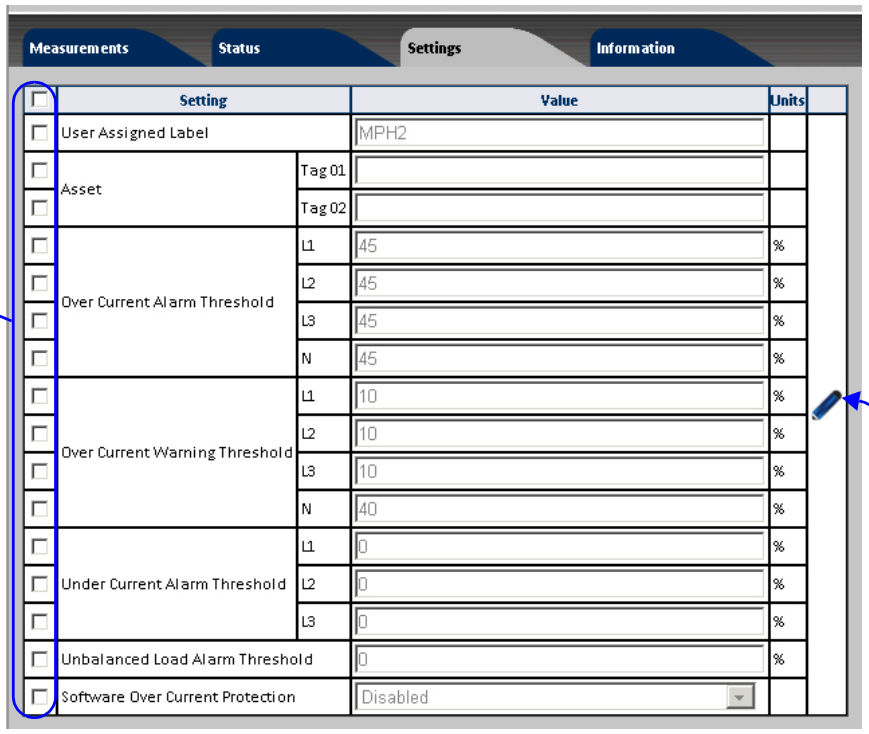
1. Log in with the privileges required to change these settings.
2. From the PDU Explorer tab, highlight the rack PDU to be edited by clicking in one of its fields.

NOTE
Clicking a rack PDU will open its branch page.

3. In the table at the bottom of the page, click the Settings tab.
4. Check the box or boxes next to the settings to be edited.
5. Click the **Edit** icon .
6. Enter the new values or use the drop-down menu to enable or disable software overcurrent protection. At the branch level view, a drop-down menu also permits designating a receptacle as critical or non-critical
7. When finished, click the **Save** icon, ✔, to make the change or click the **Cancel** icon to abort the change. The icons will be in the column formerly occupied by the **Edit** icon.

Figure 15 PDU Explorer tabs: Settings

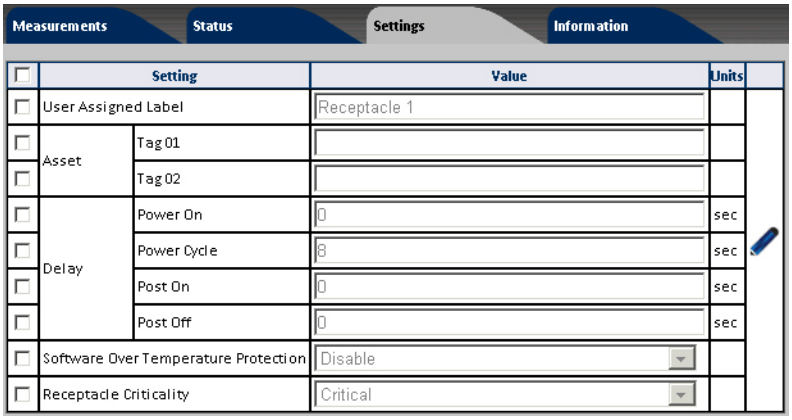
Settings Tab at Rack PDU Level



One item or all may be selected for changing by putting a checkmark in the boxes. Clicking in the top box puts a checkmark in all the boxes.

The Edit icon is a pencil. Pencil is replaced by Save and Cancel icons after the Edit icon is clicked.

Settings Tab at Branch

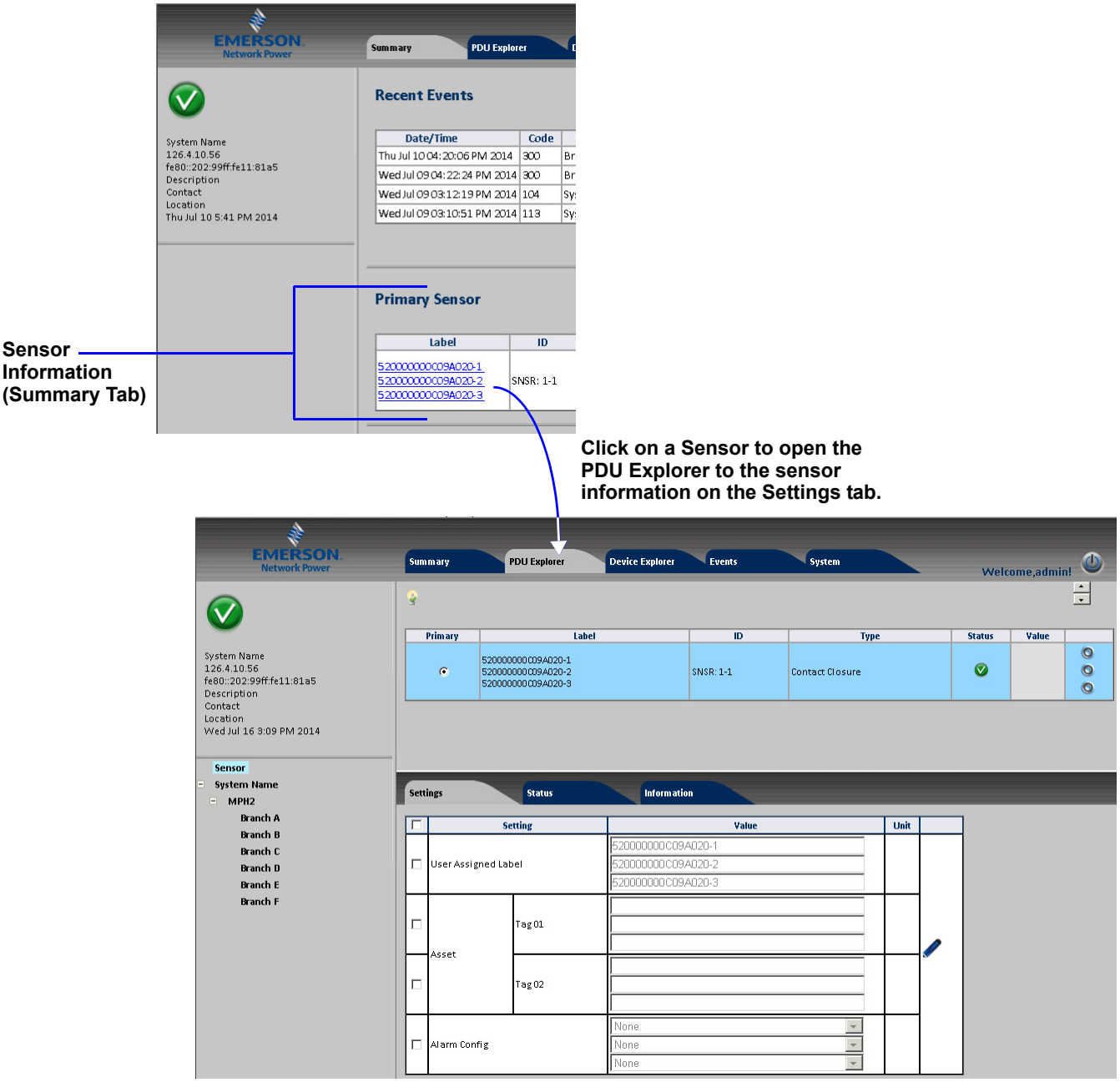


4.3.4 PDU Explorer Tabs: Settings-Controlling Sensors

Sensor information is displayed on the RPC2 communications module's Main Page. Clicking on a displayed sensor opens the PDU Explorer's Setting page to the sensor information.

The PDU Explorer Settigns tab permits labeling sensors and setting an alarm to sound dpending on whether the sensor contact is open or closed.

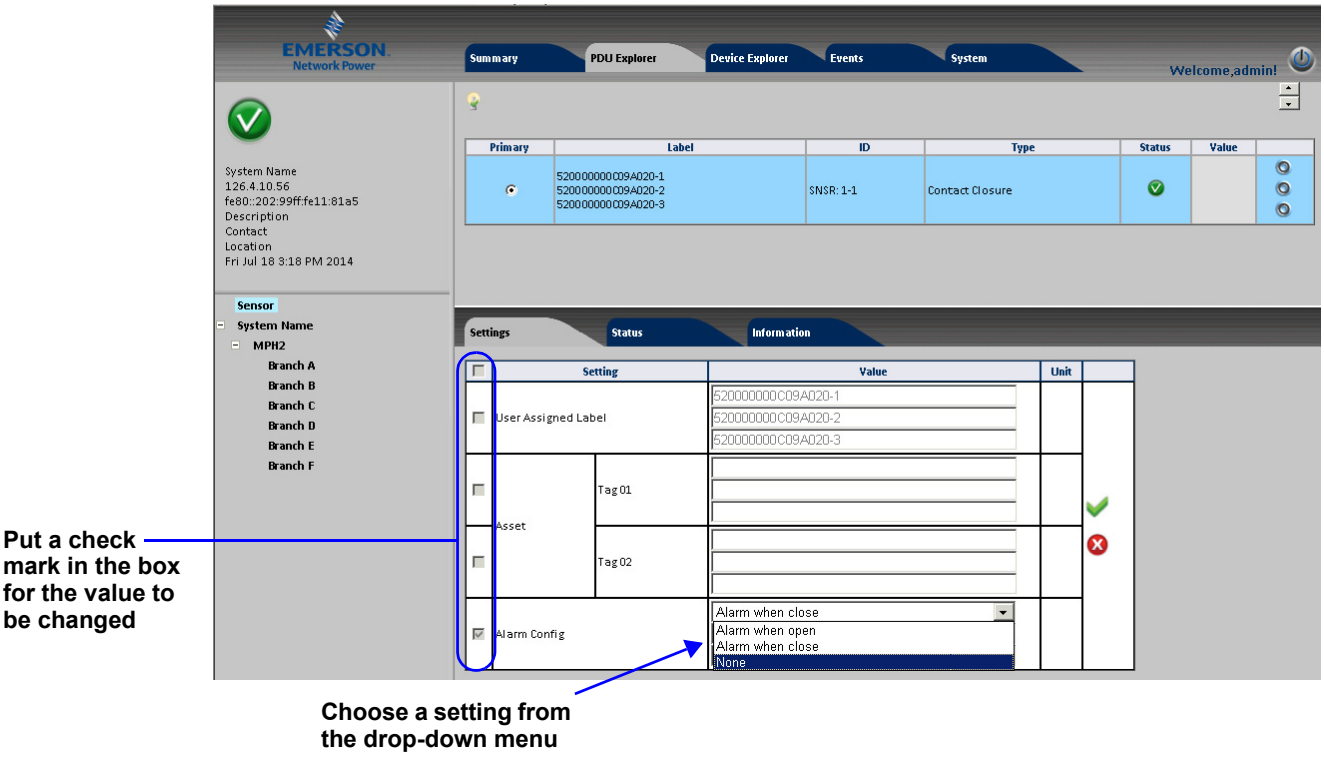
Figure 16 Sensor information on Summary Tab and details on Settings Tab



To edit sensor information:

1. Put a checkmark, ✔, in the box to the left of the portion to be changed.
2. Click the **Edit** icon
   - If assigning a label: Enter the new label (the default is the sensor's serial number).
   - If changing the Asset (sensor in this case): Enter a new name for the sensor (default names are Tag01 and Tag02.
   - If changing the **Alarm Config**, click on the drop-down menu and choose **Alarm when close, Alarm when open** or **None**.
3. Click the **Save** icon,✔, to save the change or click the **Cancel** icon to discard the change.

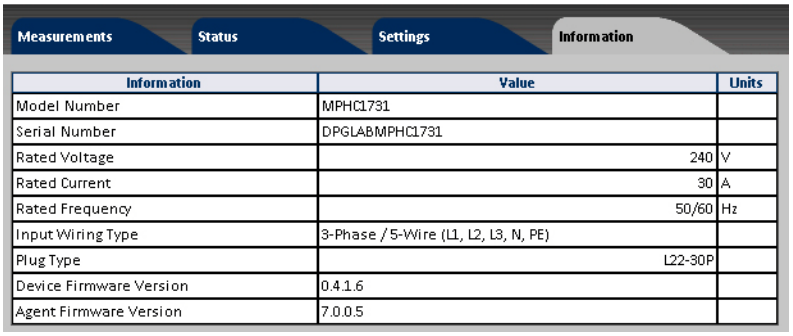
Figure 17 Change a sensor value



4.3.5 PDU Explorer Tabs: Information

The PDU Explorer's Settings tab displays information about the MPH2 as shown in **Figure 18**. The information on the tab is read-only.

Figure 18 PDU Explorer tabs: Information



Information	Value	Units
Model Number	MPHC1731	
Serial Number	DPGLABMPHC1731	
Rated Voltage	240	V
Rated Current	30	A
Rated Frequency	50/60	Hz
Input Wiring Type	3-Phase / 5-Wire (L1, L2, L3, N, PE)	
Plug Type	L22-30P	
Device Firmware Version	0.4.1.6	
Agent Firmware Version	7.0.0.5	

Click the PDU Explorer tab to view all connected rack PDU's. Each rack PDU is displayed along with its summary information. Energy can be reset by checking the box next to a rack PDU then clicking either the **Reset All Energy** or the **Reset Selected Energy** icon at the top of the page.

Table 7 PDU summary descriptions

Item	Description
Label	The rack PDU name.
ID	The position in an array of the rack PDU.
Status	The status of the rack PDU.
State	Whether the branch overcurrent breaker is open or closed.
Line	The label of the currently viewed input line.
Current Available	The available current until alarm.
Current Used	The current being used.
Current Utilization	Percentage of the current being used.
Graphical Display	Graphical representation of the low current alarm threshold, overcurrent warning threshold and overcurrent alarm threshold.

4.4 PDU Explorer—Branch information

Click on a rack PDU in either the content area or from the navigation tree to display its branch information. Energy can be reset by checking the box next to a rack PDU, then clicking either the **Reset All Energy** or the **Reset Selected Energy** icon at the top of the page.

Table 8 Branch summary descriptions

Item	Description
Label	Displays the branch name.
ID	Displays the position of the branch on the rack PDU.
Status	Displays the status of the branch.
State	Displays the state of the circuit breaker for the branch.
Line	Displays the label of the currently viewed input line.
Available Current	Displays the available current for the branch.
Utilized Current	Displays the current being used by the branch.
Utilization	Displays percentage of the current being used by the branch.
Graphical Display	A graphical representation of the low current alarm threshold, overcurrent warning threshold and overcurrent alarm threshold.

The table at the bottom of the Web page displays the selected branch's measurements, status, settings and information.

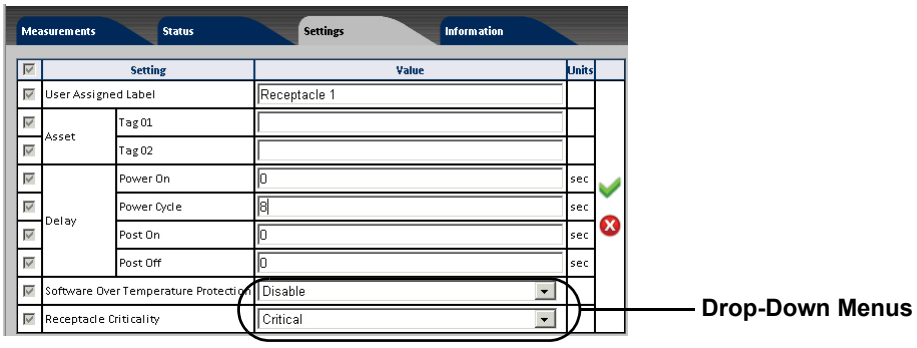
The **Measurements** tab displays the rack PDU"s current, voltage, power and energy information. The **Status** tab displays whether the branch is within acceptable limits for overcurrent, low current, low voltage, failure and breaker thresholds. The Information tab displays general information about the branch. The **Settings** tab permits editing settings on the branch.

To edit a branch:

1. Log in with the privileges required to change these settings.
2. From the PDU Explorer tab, click the rack PDU with the branch to be edited.
3. Highlight the branch to be edited by clicking in one of its fields.

NOTE
Clicking a branch will open its receptacle page.

4. In the table at the bottom of the page, click the **Settings** tab.
5. Check the box or boxes next to the settings to be edited.
6. Click the **Edit** icon .
7. Enter the new values or use a drop-down menu to enable or disable software overcurrent protection or change whether the branch is designated critical.
8. When finished, click the **Save** icon, ✔, to make the change or click the **Cancel** icon to abort the change. The icons will be in the column formerly occupied by the **Edit** icon.



4.5 PDU Explorer—Receptacle Information

Click on a branch in either the content area or from the navigation tree to display its receptacles. Check the box beside the receptacles to be managed and use the icons at the top of the page to Reset Energy, Enable Receptacle(s) Power, Disable Receptacle(s) Power, Cycle Receptacle(s) Power, Lock Receptacle(s), Unlock Receptacle(s) or Blink Receptacle(s) LED.

Table 9 Receptacle summary descriptions

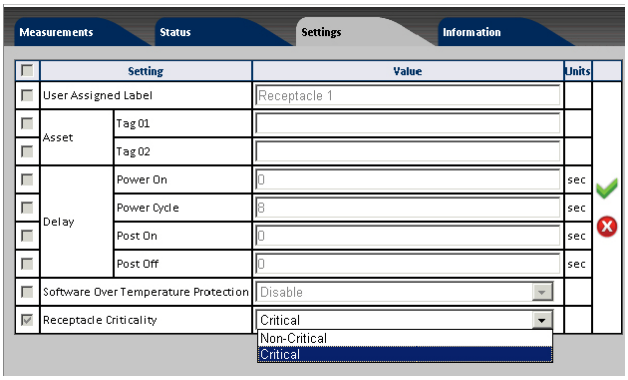
Item	Description
Label	Displays the receptacle name.
ID	Displays the position of the receptacle on the rack PDU.
Type	Displays the type of the receptacle.
Status	Displays the status of the receptacle.
State	Displays whether the receptacle is On or Off.
Lock	Displays whether the receptacle is locked or unlocked.
Available Current	Displays the available current for the receptacle.
Utilized Current	Displays the current being used by the receptacle.
Utilization	Displays percentage of the current being used by the receptacle.
Graphical Display	A graphical representation of the low current alarm threshold, over current warning threshold and overcurrent alarm threshold.

The table at the bottom of the screen displays the selected receptacle's measurements, status, settings and information.

The Measurements tab displays the receptacle's current, voltage, real power, apparent power, power factor, energy and crest factor information. The Status tab displays whether the receptacle is within acceptable limits for overcurrent and low current thresholds. The Information tab displays general information about the receptacle. The Settings tab permits editing settings on a receptacle.

To edit a receptacle:

1. Log in with the privileges required to change these settings.
2. From the PDU Explorer tab, click the rack PDU with the branch containing the receptacle to be edited.
3. Click the branch with the receptacle to be edited.
4. Highlight the receptacle to be edited by clicking on it.
5. In the table at the bottom of the page, click the Settings tab.
6. Check the box or boxes next to the settings to be edited.
7. Click the **Edit** icon .
8. Enter the new values or use the drop-down menu to enable or disable software overcurrent protection or change whether the receptacle is designated critical.
9. When finished, click the **Save** icon, ✔, to make the change or click the **Cancel** icon to discard the change.

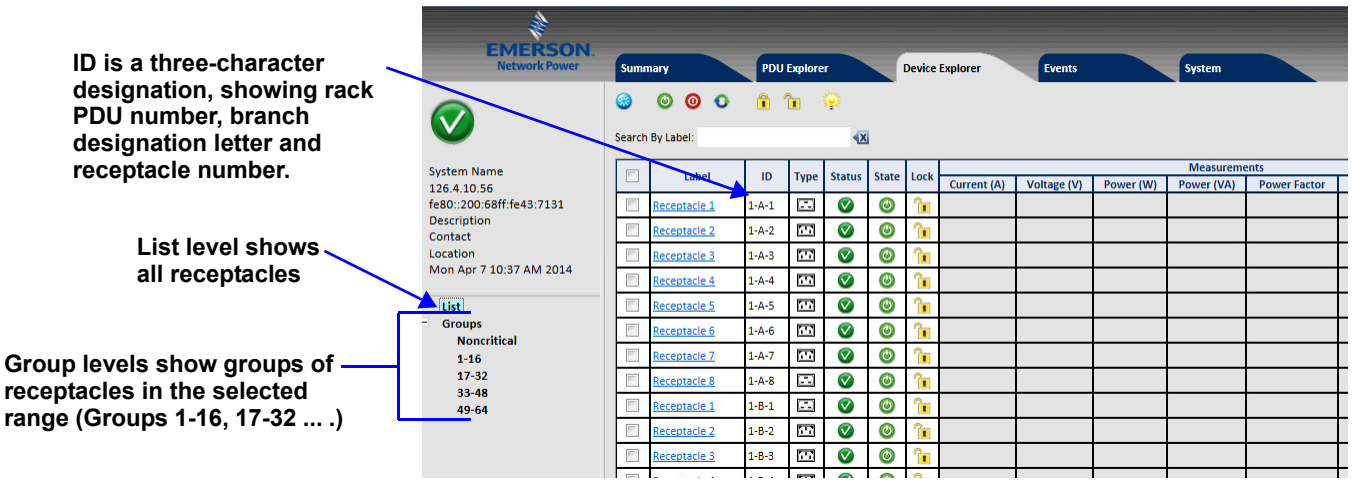


4.6 Device Explorer

The Device Explorer tab permits viewing the status of all receptacles on a rack PDU. As with the PDU Explorer, place a check mark (✔) in the box or boxes next to receptacles and then use the icons at the top of the page to Reset Energy, Enable Receptacle Power, Disable Receptacle Power, Cycle Receptacle Power, Lock Receptacle, Unlock Receptacle or Blink Receptacle LED.

Clicking on a receptacle will open the PDU Explorer view of the selected receptacle.

Figure 19 Device Explorer tab



4.6.1 Device Explorer—Receptacle Groups

Receptacles on rack PDU's with receptacle-level control may be grouped for management and monitoring. No receptacles are grouped in the factory-default setup of the RPC2 communications module. Grouping enables applying the same change to all receptacles in a group in a single operation. For example, all receptacles in a group may be turned On or Off with one action, instead of having to be switched On or Off separately.

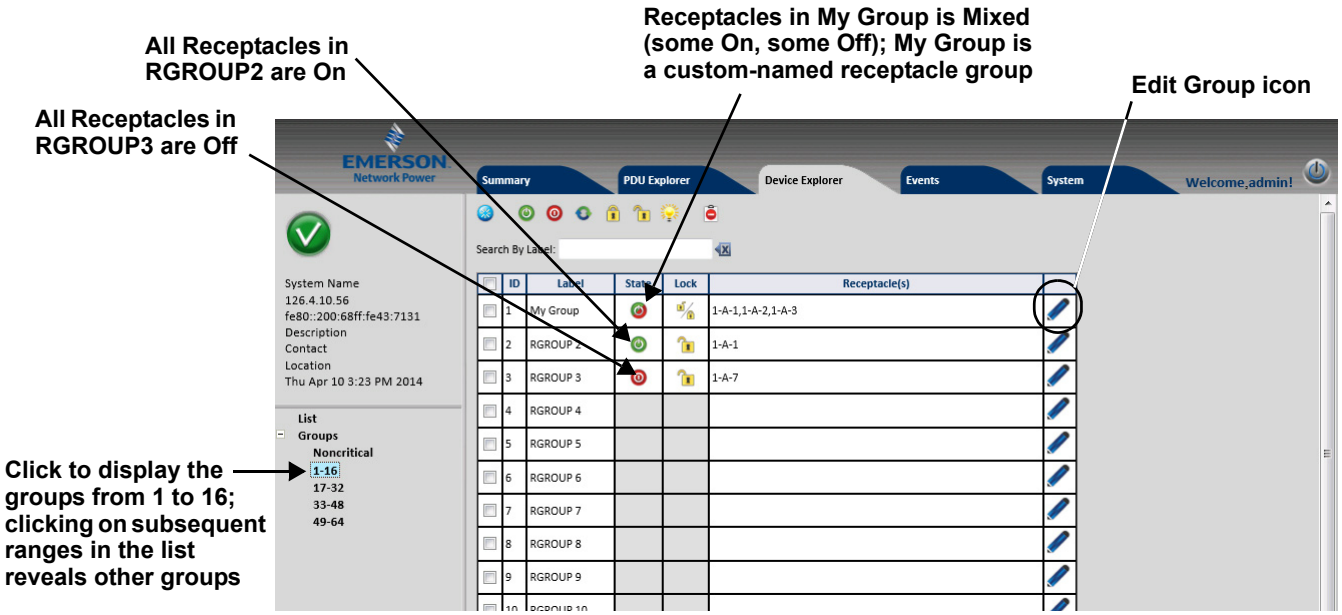
Up to 64 receptacle groups are possible. Group names may be changed, except the standard Noncritical group name.

Noncritical Group

The Noncritical group is intended for linking receptacles powering non-essential equipment. This receptacle group can be shut down for power conservation and similar purposes, such as when utility power fails and a UPS is powering rack equipment.

All receptacles are critical by default. No receptacles will in the Noncritical Group unless they are added by a user with administrative privileges.

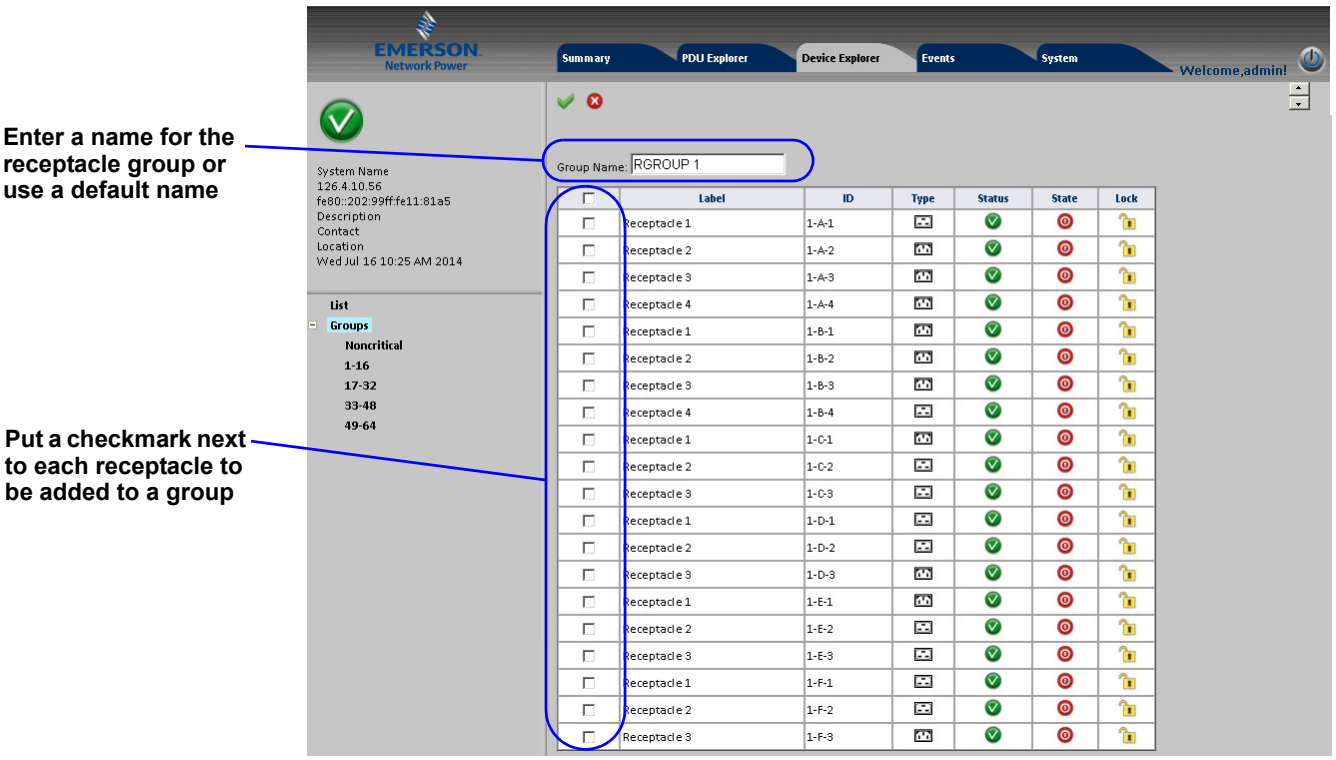
Figure 20 Receptacle group screen



Create a Receptacle Group

1. Navigate to the Device Explorer tab.
2. Click the **Edit Group** icon. A list of all receptacles will be displayed.
3. Put a checkmark (✔) beside each receptacle to be added to the group.
4. Name the group or use one of the default group names.
5. Click the **Save** icon, ✔.

Figure 21 Creating a receptacle group



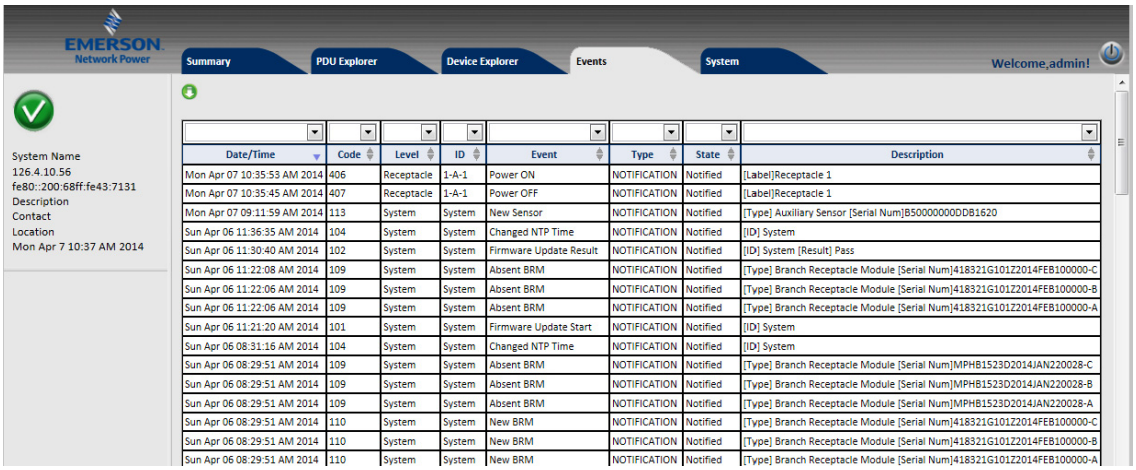
4.7 Events Tab

Click the Events tab to see a list of rack PDU events. Use the drop-down menus to filter events.

Events can be configured for SNMP Traps, Syslog, Email and SMS in the System Tab.

Click the **Download** icon at the top of the page to download a log file for all events. A downloaded event log can be imported into Microsoft® Excel® and viewed as a spreadsheet.

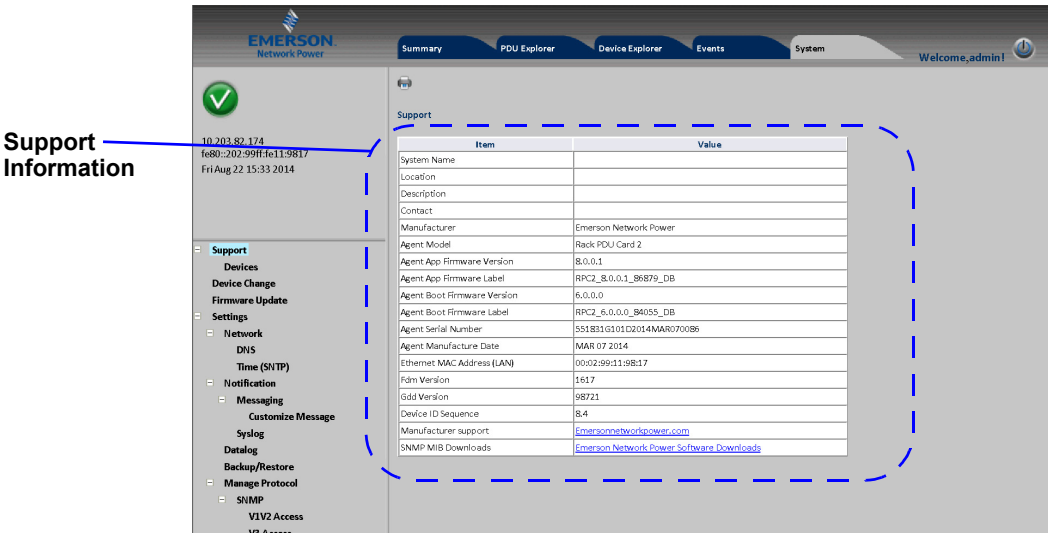
Figure 22 Events tab


EMERSON
Network Power
Summary
PDU Explorer
Device Explorer
Events
System
Welcome,admin!
System Name
126.4.10.56
fe80::200:68ff:fe43:7131
Description
Contact
Location
Mon Apr 7 10:37 AM 2014
Date/Time
Code
Level
ID
Event
Type
State
Description
Mon Apr 07 10:35:53 AM 2014 406 Receptacle 1-A-1 Power ON NOTIFICATION Notified [Label]Receptacle 1
Mon Apr 07 10:35:45 AM 2014 407 Receptacle 1-A-1 Power OFF NOTIFICATION Notified [Label]Receptacle 1
Mon Apr 07 09:11:59 AM 2014 113 System System New Sensor NOTIFICATION Notified [Type] Auxiliary Sensor [Serial Num]B50000000DDB1620
Sun Apr 06 11:36:35 AM 2014 104 System System Changed NTP Time NOTIFICATION Notified [ID] System
Sun Apr 06 11:30:40 AM 2014 102 System System Firmware Update Result NOTIFICATION Notified [ID] System [Result] Pass
Sun Apr 06 11:22:08 AM 2014 109 System System Absent BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G101Z2014FEB100000-C
Sun Apr 06 11:22:06 AM 2014 109 System System Absent BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G101Z2014FEB100000-B
Sun Apr 06 11:22:06 AM 2014 109 System System Absent BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G101Z2014FEB100000-A
Sun Apr 06 11:21:20 AM 2014 101 System System Firmware Update Start NOTIFICATION Notified [ID] System
Sun Apr 06 08:31:16 AM 2014 104 System System Changed NTP Time NOTIFICATION Notified [ID] System
Sun Apr 06 08:29:51 AM 2014 109 System System Absent BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]MPHB1523D2014JAN220028-C
Sun Apr 06 08:29:51 AM 2014 109 System System Absent BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]MPHB1523D2014JAN220028-B
Sun Apr 06 08:29:51 AM 2014 109 System System Absent BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]MPHB1523D2014JAN220028-A
Sun Apr 06 08:29:51 AM 2014 110 System System New BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G101Z2014FEB100000-C
Sun Apr 06 08:29:51 AM 2014 110 System System New BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G101Z2014FEB100000-B
Sun Apr 06 08:29:51 AM 2014 110 System System New BRM NOTIFICATION Notified [Type] Branch Receptacle Module [Serial Num]418321G101Z2014FEB100000-A

4.8 System Tab

The System tab permits viewing information about the RPC2 communications module, as shown in **Figure 23**. An administrator can configure the RPC2 communications module's parameters, such as notifications and SNMP traps and access. An administrator can also update the RPC2 communications module's firmware and change passwords.

Figure 23 System tab



4.8.1 System Tab—Support

Click **Support** in the System tab navigation tree to view information about the RPC2 communications module. Click the **Print** icon at the top of the page to print the summary table.

NOTE
This is a read-only page.

4.8.2 System Tab—Devices

Click **Devices** in the System tab navigation tree to view a read-only page about the MPH2 rack PDU and the RPC2 communications module. Available information includes the System Name (user-specified), system location, system description, contact personnel names, MPH2 manufacturer, the RPC2 serial number and firmware label and the MPH2 model, serial number and firmware version.

Click the **Print** icon at the top of the page to print the summary table.

4.8.3 System Tab—Device Change

Click **Device Change** in the System tab navigation tree to to view device changes, such as a Rack PDU Array™ being added or removed, a rack PDU being added to an array, sensors being added or removed or a module added to a Liebert MPX. This page displays module serial number and type and shows when modules were added and removed. Click the **Acknowledge** icon to acknowledge changes and remove them from the page.

NOTE

A large white X on a red background is displayed in the upper left corner when a device change has not been acknowledged by the user. This will occur at initial startup, when the RPC2 communications module is installed for the first time, when a sensor is added or removed and in similar instances. After an event or change has been acknowledged, the event may take a few seconds to clear and the X should change to a white checkmark (✔) on a green background.

An X is also displayed if alarms are present.

4.8.4 System Tab—Firmware Update

Firmware updates may be downloaded from the Downloads section of the Emerson Network Power® Web site (**www.emerson.com**). Once downloaded, the update may be applied to all RPC2 communications modules in an installation through the RPC2 communications module's Web interface.

The RPC2 communications module permits unattended firmware updates. The browser being used may be closed after the progress bar is displayed.

1. Log in with the privileges required to perform an update.
2. Click on the System tab, then **Support>Firmware Update** in the navigation tree.
3. Select the method of updating from the list:
   - Web (http)
   - FTP
   - TFTP
4. Click the Browse button to find and open the downloaded *.epm* file on the host PC or network. The selected file name is displayed in a text box.
5. Click the **Start Firmware Update** icon to begin updating or click the **Cancel** icon to clear the file name and begin again.
6. The firmware update progress will be shown in the on-screen status. Once the process is finished, the system will resume displaying rack PDU information.

4.8.5 System Tab—Settings

Click **Settings** in the System tab's navigation tree to configure the settings for the RPC2 communications module. Use the icons at the top of the page to save or cancel the changes. The Settings page also permits resetting the RPC2 communications module to factory defaults, rebooting the system and opening a command line interface session. To manage RPC2 communications module settings:

1. Log in with the privileges required to change these settings.
2. From the System tab, click **Settings** in the side navigation bar.
3. Enter a System Name and Description for the RPC2 communications module.
4. Enter a Contact Name and Location.
5. Use the drop-down menu to display the temperature in either Celsius or Fahrenheit.
6. Enter the SWOTP Delay (how long the module waits before turning Off receptacles) in seconds.
7. Use the drop-down menu to select either a 12-hour or 24-hour time format.
8. Click the **Save** icon, ✔, when finished.

Network

The **Network** page permits configuring the speed/duplex and hostname as well as IPv4 and IPv6 static routes. To configure network parameters:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Network**.
3. Use the drop-down menu to select **Speed/Duplex**.
4. Enter the host name in the Host Name field.
5. IPv4 is selected by default; to use IPv6, put a check mark (✔) the box next to IPv6.
6. For IPv4 or IPv6, select either Static or DHCP for the boot mode and enter the IP Address, Subnet Mask and Default Gateway in the appropriate fields.
7. Click the **Save** icon when done.

DNS

From the Domain Name Server (DNS) settings menu, an administrator can configure the servers the RPC2 communications module will use for hostname resolution. When configured, host addresses for SNMP, Network Time and Email/SMS can be specified in either full Domain Name format or host-only format, provided that the appropriate Domain Name Suffix is used.

The DNS menu is used to set parameters for network access to the RPC card. Consult your network administrator for these settings.

To configure DNS Server settings:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Network>DNS**.
3. Select whether to obtain DNS server addresses automatically or to enter them manually.
4. If they will not be obtained automatically, enter the primary and secondary DNS addresses.
5. Use the drop-down menu to select in hours how long the RPC2 communications module retains resolved addresses.
6. Enter the Domain Name Suffix. This suffix is used for assembling a fully qualified domain name when a host-only name is specified.
7. Click the **Save** icon when finished.

DNS Test

The DNS Test function checks whether the RPC2 communications module will resolve a hostname to an IP address.

To run a DNS test:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Network>DNS**.
3. Under the **DNS Test** heading, use the drop-down menu to select a fully qualified domain name or an IP address.
4. In the **Question** field, enter a value for the DNS to answer.
5. Click the **Query** icon at the top of the page to attempt a lookup with the provided information.

Time (SNTP)

The RPC2 communications module provides two options for setting the date and time. It can retrieve the date and time from a simple network time protocol (NTP) server, or the date and time can be set manually so that the rack PDU's internal clock is used to provide time and date information.

To set the date and time:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Network**.
3. Under the **SNTP** heading, select **NTP** Server to use a NTP server.
   -or- Select **Local** to manually set the date and time.
4. If using NTP, enter an NTP server site in the Time Server field.
5. Select either **Hourly** or **Daily** for the synchronize rate.
6. Use the drop-down menu to select the time zone.
7. If manually setting the date and time, enter the time in YYYY-MM-DD HH:MM:SS format in the **System Date and Time** field.
8. Click the **Save** icon, ✔..

NOTE
To re-sync the time immediately, click the Sync Time Now icon at the top of the page.

Notification

The RPC2 communications module will generate notifications for a wide variety of events. It can be configured to direct or store those event notifications for immediate use or for analysis later. To configure notifications:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Notification**.
3. For each notification type, check the box or boxes next to the type of notification to be sent: e-mail, SMS, SNMP Trap or SysLog notifications.

NOTE
Check the box next to the heading to select that type of notification for all events in the list.

4. Click the **Save** icon, ✔, when finished.

Messaging

An administrator can configure e-mail and SMS settings to be used for notifications from the Messaging page. To verify the settings once configuration is complete:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Notification>Messaging**.
3. Check the box the next to **Email** to enable configuration of e-mail settings.
4. Enter the address the e-mail notification will be sent from and the address or addresses it will be sent to.
5. Check the radio button to either use the event or to create a custom subject for the e-mail.
6. Enter the SMTP server and port number.
7. Click the **Save** icon, ✔, at the top of the page.
8. To verify the e-mail configuration, click the **Verify Email** icon at the top of the page.

To configure SMS settings:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Notification>Messaging**.
3. Check the box the next to **SMS** to enable configuration of SMS settings.
4. Enter the address the SMS notification will be sent from and the address or addresses it will be sent to in the appropriate fields.
5. Check the radio button to either use the event or to create a custom subject for the e-mail.
6. Enter the SMTP server and port number.
7. Click the **Save** icon, ✔, at the top of the page.
8. To verify the SMS configuration, click **Verify SMS** at the top of the page.

Customize Message

An administrator can customize an e-mail or SMS message as well as configure e-mails and SMS event consolidation. To customize a message:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Notification>Messaging>Customize Message**.
3. Under the **Customize Message** heading, check the items to be included for e-mail and/or SMS messaging.
4. Click the **Save** icon, ✔, at the top of the page.

To configure e-mail and SMS event consolidation:

1. From the side navigation bar of the System tab, click **Notification>Messaging>Customize Message**.
2. Under **Configure Email/SMS Event Consolidation**, check the boxes to enable e-mail or SMS consolidation.
3. Enter the consolidation time limit in number of seconds and enter the consolidation event limit in number of events.
4. Click the **Save** icon, ✔, at the top of the page.

Syslog

Syslog notifications can be sent to up to four IPv4 or IPv6 addresses. To enable Syslog notifications:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Notification>Syslog**.
3. Check the box to enable either IPv4 or IPv6 addressing and enter up to four addresses.
4. Click the **Save** icon, ✔.

Datalog

An administrator can enable data logging for rack PDUs, branches or receptacles and export the data log to an FTP site. To enable data logging:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Notification>Datalog**.
3. Under the **Datalog** heading, check the box to enable data logging.
4. Use the drop-down menus to enable or disable PDU, branch or receptacle data logging.
5. Use the drop-down menu to enter the data logging interval in number of minutes.
6. Click the **Save** icon, ✔, when finished.

To export a data log:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Notification>Datalog**.
3. Under the **Export** heading, enter the IP address, username and password for the FTP site where the data log will be exported.
4. Enter the path and filename for the data log.

NOTE
The default filename is sys-data.log.

5. Click the **Export** icon when finished.

Clicking the **Flush** or **Download** icon at the top of the screen will either clear or download the data log.

Backup and Restore

An administrator can configure an FTP site to backup a configuration file or restore configuration from a backup file. To configure where the backup will be stored:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, click **Notification>Backup and Restore**.
3. Check the radio button next to **FTP Site** and enter the IP address, username and password for the FTP site where the data log will be exported. Then enter the path and filename for the configuration file.

   -**or**- Check the radio button next to Local, click **Choose File**, browse to the location where the file will be saved and enter a name for the configuration file.
4. Click the **Save** icon, ✔, when finished.

To backup the configuration, click the **Save Configuration** icon at the top of the page, then click **OK**. To restore from the last saved configuration, click the **Restore Configuration** icon at the top of the page and click **OK**.

Manage Protocol

From the Manage Protocol page, an administrator can enable or disable the Velocity Server, SNMP agent, SSH support, Telnet and Web Server. From this page an administrator can also disable or set the inactive timeout and configure the maximum number of Telnet sessions allowed.

Modifying Velocity or SNMP will require rebooting the RPC2 communications module. The RPC2 communications module can be rebooted by accessing **System>Settings>Reboot**.

SNMP

An administrator can configure SNMP, which is needed if notifications are to be sent to an SNMP management application. The RPC2 communications module supports SNMP v1, v2 and v3. To configure SNMP:

1. Log in with the privileges required to change these settings.
2. From the side navigation bar of the System tab, Click **Manage Protocol>SNMP**.
3. Use the drop-down menu to enable or disable SNMP v1/v2.
4. Use the drop-down menu to select either SNMPv1 or SNMPv2 for the SNMP traps.
5. Enter the port number for the SNMP UDP port and the SNMP Traps UDP port.
6. Use the drop-down menu to enable or disable the Liebert Global Products (LGP) MIB and MIB traps for querying information in that MIB.
7. Use the drop-down menu to enable or disable the authentication trap. If enabled, an SNMP authentication trap will be sent to all trap targets.
8. Use the drop-down menu to enable or disable the System Notify trap for system traps to be sent per the LGP MIB.

NOTE
LGP MIB must also be enabled to enable system notify traps.

9. Disable or set the heartbeat interval in number of minutes. This specifies how often a heartbeat trap will be sent to show that a device is online and functioning normally.
10. Use the drop-down menu to enable or disable SNMPv3.
11. Click the **Save** icon, ✔, when finished.

SNMPv1/v2 Access

From the side navigation bar of the System tab, click SNMP-v1/v2 Access to configure the SNMP v1/v2 communities settings. Up to 20 devices can be configured with permission to access the RPC2 communications module, identified by IP address or hostname, read/write privileges and community string.

Table 10 SNMPv1/v2 access description

Parameter	Description
Entry	As many as 20 devices may be configured for access.
Network Name	The IP address of the target to receive traps.
Access	Click the Read radio button to allow users to view but not change data. Click the Write radio button to give full permissions for configuration, control and viewing.
Community	The community string used the by IP host for this entry.
Clear	Click Clear to delete all values for this entry.

NOTE

A network name of 0.0.0.0 with write access and a public community will grant access to any host computer.

SNMPv3 Access

From the side navigation bar of the System tab, click SNMP>V3 Access to configure the SNMPv3 communities settings. Up to 20 devices can be configured with permission to access the RPC2 communications module, identified by IP address or hostname, read/write privileges and community string.

Table 11 SNMP V3 access description

Parameter	Description
Entry	As many as 20 devices may be configured for access.
User Enable	User Enable must be checked for each user to be configured for access. A maximum of 20 devices may be configured for access.
User Name	The IP address of the network host to receive access to device information or traps.
Authentication Type	Options are none, MD-5 or SHA.
Authentication Secret	Password between 8-64 characters for SNMPv3 request.
Privacy Type	Options are no encryption or DES.
Privacy Secret	Password of 8-64 characters for SNMPv3 request.
Access	No Access provides no access, ReadOnly provides only the ability to view data. Read/Write provides full permissions for configuration, control and viewing.
Source	Either an IP address or the network name of the host. To enable multiple hosts, enter network names separated by a comma.
Clear	Click Clear to delete all values for this entry.

NOTE

A configuration with sources set to 0.0.0.0 with write access and no authentication will grant access to any host computer.

SNMPv1/v2 Traps

An administrator can configure up to 20 users to receive notifications from the RPC2 communications module, identified by IP address or hostname, trap listen port and community string. To configure SNMPv1/v2 Traps:

1. From the side navigation bar of the System tab, click **Manage Protocol>SNMP>V1V2 Traps**.
2. Enter the network name, port number and community string in the appropriate fields.
3. Check the box to enable the heartbeat feature.
4. Click the **Save** icon, ✔, at the top of the page when finished.
5. To verify the configuration, click the **Verify** icon at the top of the page.

Table 12 SNMPv1/v2 trap descriptions

Parameter	Description
Entry	Enter up to 20 targets to receive traps.
Network Name	The IP address or network name of the target to receive traps.
Port	The Trap Listen Port where traps will be sent. Use 162 if the host computer uses standard ports.
Community	The community string used the by the IP host for this entry (case sensitive, up to 32 characters).
Heartbeat	Check the box to enable a heartbeat check.
Clear	Click Clear to delete all values for this entry.

SNMPv3 Traps

An administrator can configure up to 20 users to receive notifications from the RPC2 communications module. Users must be identified by IP address or hostname, trap listen port and community string.

To configure SNMPv3 Traps:

1. From the side navigation bar of the System tab, click **Manage Protocol>SNMP>V3 Traps**.
2. Enter the user name, port number and destinations.
3. Use the drop-down menu to enable or disable notifications.
4. Check the box to enable the heartbeat feature.
5. Click the **Save** icon, ✔, at the top of the page when finished.
6. To verify the configuration, click the Verify icon at the top of the page.

Table 13 SNMPv3 traps descriptions

Parameter	Description
Entry	Enter up to 20 targets to receive traps.
User Name	The IP address or network name of the host to receive traps.
Notify	Enable or disable notifications being sent to the user from the module.
Destination	The IP address or the network name of the network host that will receive notifications from the module. Use a comma to separate multiple hosts.
Heartbeat	Check the box to enable a heartbeat check.
Port	The Trap Listen Port where traps will be sent. Use 162 if the host computer uses standard ports.
Clear	Click Clear to delete all values for this entry.

Web Server

An administrator can configure access to the module through the Web interface.

To configure access through the Web interface:

1. From the side navigation bar of the System tab, click **Manage Protocol>Web Server**.
2. Use the drop-down menu to select either HTTP or HTTPS for the Web Server.
3. Enter the port number for the HTTP or HTTPS server.
4. Enter the amount of time in seconds the RPC2 communications module refreshes.
5. Click the **Save** icon, ✔, at the top of the screen when finished.

4.8.6 Authentication

Authentication can be performed locally or on a remote Kerberos, LDAP, Radius or TACACS+ authentication server. If the rack PDU is managed by an Avocent® DSView server, DSView authentication is also supported.

The rack PDU also supports remote group authorizations for the LDAP, Radius and TACACS+ authentication methods.

An administrator can configure authentication using the Web interface or the command line interface. The default authentication method for the rack PDU is Local. Any authentication method that is configured for the rack PDU is used for authentication of any user who attempts to log in through Telnet, SSH or the Web manager

To select an authentication type:

1. From the side navigation bar of the System tab, click **Authentication**.
2. Use the drop-down menu to select the authentication type.
3. Click the **Save** icon, ✔, at the top of the page.

Remote Servers

Using a remote server requires configuring its IP address and, in most cases, other parameters before it can be used. The following remote servers require configuration:

- DSView
- RADIUS
- TACACS+
- LDAP(S) AD
- Kerberos

To configure a DSView authentication server:

1. From the side navigation bar of the System tab, click **Authentication>Remote Servers>DSView**.
2. Enter IP Address 1 - 4 for the DSView servers.
3. Click the **Save** icon, ✔, at the top of the page.

To configure a RADIUS authentication server:

1. From the side navigation bar of the System tab, click **Authentication>Remote Servers>Radius**.
2. Enter the IP addresses of the First Authentication Server and First Accounting Server.
3. If used, enter the IP addresses for the Second Authentication Server and Second Accounting Server.
4. Enter the secret word or passphrase in the Secret field (applies to both first and second authentication and accounting servers), then re-enter the secret word or passphrase in the Confirm Secret field.
5. Enter the desired number of seconds for server time-out in the Timeout field.
6. Enter the desired number of retries in the Retries field.
7. Click the **Save** icon, ✔, at the top of the page.

To configure a TACACS+ authentication server:

1. From the side navigation bar of the System tab, click **Authentication>Remote Servers>TACACS+**.
2. Enter the IP addresses for the First Authentication Server and First Accounting Server.
3. If used, enter the IP addresses of the Second Authentication Server and Second Accounting Server.
4. Select the desired service (PPP, raccess or shell) from the Service drop-down menu.
5. Enter a secret word or passphrase in the Secret field (applies to both first and second authentication and accounting servers), then re-enter the secret word or passphrase in the Confirm Secret field.
6. Enter the desired number of seconds for server time-out in the Timeout field.
7. Enter the desired number of retries in the Retries field.
8. Use the drop-down menu to select the TACACS+ version.
9. Click the **Save** icon, ✔, at the top of the page.

To configure an LDAP(S)|AD authentication server:

1. From the side navigation bar of the System tab, click Authentication-Remote Servers-LDAP(S)|AD.
2. Enter the IP address of the server.
3. Enter the Base.
4. At the **Secure** drop-down menu, select **Off**, **On** or **Start_TLS**.
5. Enter the Database User Name.
6. Enter a Database Password, then re-type the database password in the Confirm Password field.
7. Enter the desired Login Attributes.
8. Click the **Save** icon, ✔, at the top of the page.

To configure a Kerberos authentication server:

1. From the side navigation bar of the System tab, click **Authentication>Remote Servers>Kerberos**.
2. Enter the IP address (Realm) of the server.
3. Enter the Realm Domain Name (example: liebert.com).
4. Enter the Domain Name (example: liebert.com).
5. Click the **Save** icon, ✔, at the top of the page.

4.8.7 Authorization Levels

User groups are given access and authorizations either by default or as assigned by an administrator. Administrators can alter the permissions and access rights of users belonging to the appliance or user groups, or create additional groups with custom permissions and access rights. Administrators can add, delete or modify permissions and access rights for users from any group at any time.

There are four default user groups on an RPC2 communications module module.

- Admin
- Poweruser
- System User
- Custom User

Groups

An administrator can create a custom group and assign receptacles to users in the custom group. A user in a custom group will be able to view only the receptacles to which he's been given access; the other receptacles will not appear. A user in a custom group can lock and unlock only the receptacles he has access to.

A user can belong to more than one group. Members can be added or deleted from any group, but none of the default groups—administrator, power user or system user—can be deleted.

NOTE
Only one group may be modified at a time.

To add a group:

1. From the System tab's navigation tree, click **Authorization>Groups**.
2. To add a group, click the **Add** icon at the top of the page, enter the name for the new group.
3. Set the access level for members of the group by granting access to receptacles.
4. Click the **Save** icon, ✔.

To delete a group:

1. Check the box next to the group to be deleted
2. Click the **Delete** icon.

To add a user to a group:

1. From the System tab's navigation tree, click **Authorization>Groups**.
2. Check the box next to the group to be edited.
3. Click the **Edit User** icon.
4. In the Local User List or the Remote User List, select the user to be added and click the right arrow.
5. Click the **Save** icon, ✔.

To delete a user from a group:

1. From the System tab's navigation tree, click **Authorization>Groups**.
2. Check the box next to the group to be edited.
3. Click the Edit User icon.
4. In the Group User List, select the user to be removed and click the left arrow.
5. Click the **Save** icon, ✔.

To add a user to a group:

1. From the System tab's navigation tree, click **Authorization>Groups**.
2. Check the box next to the group to be edited.
3. Click the **Edit User** icon.
4. In either the Local User List or the Remote User List, select the user to be added and click the right arrow.
5. Click the **Save** icon, ✔.

To delete a user from a group:

1. From the System tab's navigation tree, click **Authorization>Groups**.
2. Check the box next to the group to be edited.
3. Click the **Edit User** icon.
4. In the Group User List, select the user to be removed and click the left arrow.
5. Click the **Save** icon, ✔.

To assign receptacles to a user group:

1. From the System tab's navigation tree, click **Authorization>Groups**.
2. Check the box next to either the user group or a custom group where the receptacles will be added.

NOTE
Receptacles cannot be assigned to the administrator, poweruser or system user groups. Each of these default groups has its access level set in the software.

3. Check the boxes next to the receptacles to be added to the group. To assign all receptacles, click the box at the top of the column.
4. Click the **Save** icon, ✔, when finished.

Users

From the User Names page, an administrator can add or delete users and change user passwords.

NOTE
The administrator's user password cannot be changed on this page.

To add a user:

1. From the System tab's navigation tree, click **Authorization>Users**.
2. Click the **Create Local User** icon.
3. Enter the username and password and confirm the password.
4. Click the **Save** icon, ✔.

To delete a user:

1. From the System tab's navigation tree, click **Authorization>Users**.
2. Check the box next to the user to be deleted.
3. Click the **Delete Local User** icon.
4. Click **OK** when prompted.

To change a user password:

1. From the System tab's navigation tree, click **Authorization>Users**.
2. Check the box next to the user whose password to be changed.
3. Click the **Change Local User's Password** icon.
   -**or**- To change your own password, from the side navigation bar of the System tab, click **Authorization>Change Password**.
4. Enter and confirm the new password.
5. Click the **Save** icon, ✔.

5.0 RPC BDM™ (OPTIONAL)

The RPC BDM is a small monitoring device that displays data from an MPH2, Liebert MPX™ or Liebert MPH™ units through a connection to an RPC2 communications module. The unit provides another way to browse PDU data using the PDU Explorer and Device Explorer, as in the Web interface.

Views shown by the RPC BDM are essentially the same as those shown by the MPH2's onboard LCD.

NOTE
The RPC BDM is a read-only display that may be used to view data but not to control or configure devices.

To perform control and configuration functions, use the Web or SNMP interface .

The display unit, which can be carried as a handheld device or mounted on a wall or in the rack, permits users to:

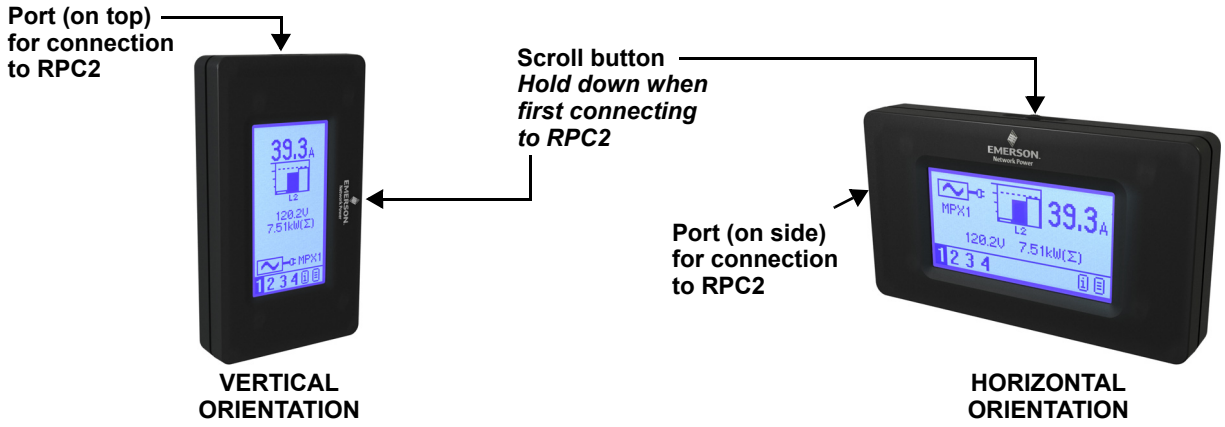
- View monitoring data
- Identify the load of PDU input lines, branch circuit breakers and receptacles (varies by model)
- Identify the load of PDU devices using the user-assigned label
- View Liebert SN™ sensor readings for areas monitored by connected sensors
- Identify the IP address and MAC address of the PDU
- Browse user-assigned receptacle labels to view parametric information
- View active events list
- Balance PDU line loads

5.1 Orientation of the RPC BDM

The RPC BDM may be rotated for vertical or horizontal display, as shown in **Figure 24**.

To set the orientation, hold down the scroll button when first connecting the RPC BDM to the RPC2.

Figure 24 Vertical or horizontal orientation


Port (on top) for connection to RPC2
Scroll button
Hold down when first connecting to RPC2
Port (on side) for connection to RPC2
VERTICAL ORIENTATION
HORIZONTAL ORIENTATION

5.2 RPC BDM™ Installation

Installing the RPC BDM requires two steps described in the following sections:

- **5.2.1 - Set the IP Address for the RPC2**
- **5.2.2 - Connect the RPC BDM to the RPC2 Communications Module** (in an MPH2 or a Liebert MPX™).

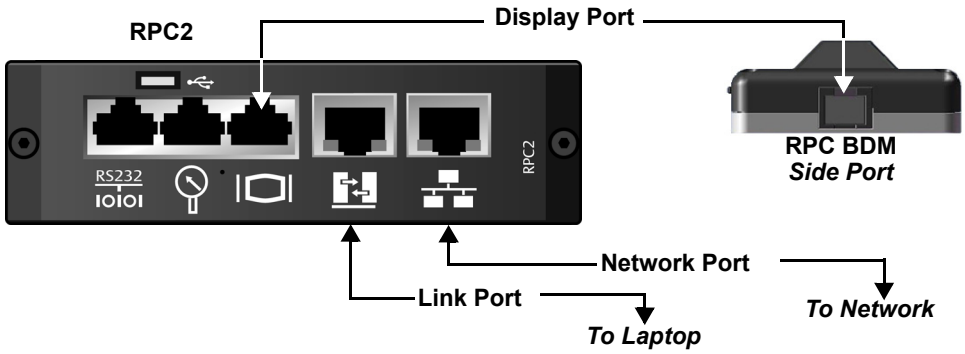
The RPC BDM comes with a factory-supplied Ethernet cable for connection to the RPC2. If additional or longer cables are needed, use standard Ethernet cables.

5.2.1 Set the IP Address for the RPC2

The RPC2 and the RPC BDM may be used on a network or on stand-alone rack PDU's. Either mode requires initializing the RPC2 with an IP address before the RPC BDM can display data.

Follow the appropriate steps to initialize the RPC2 in a networked or stand-alone environment. Refer to **Figure 25** for location of ports on the RPC2.

Figure 25 Liebert RPC ports for use with RPC BDM



To Initialize Emerson's RPC2 in a Network Environment:

1. Use an Ethernet cable to connect the Network Port to the network.
2. Obtain an IP address for the RPC2:
   a. If DHCP is used, the Network Port port will receive an IP address automatically.
   b. If DHCP is not used:
      - Use an Ethernet cable to connect the Expansion/Management port to a laptop.
      - Assign a static IP address to the Network Port port, then click Restart to initialize the RPC2, as described in **2.3 - Configure an RPC2 Communications Module for Static IP**.

To Initialize Liebert RPC in Stand-Alone Mode (Non-Networked):

1. Use an Ethernet cable to connect the Link Port to a laptop.
2. Assign a static IP address to the LAN port, then click restart to initialize the RPC2, as described in **2.3 - Configure an RPC2 Communications Module for Static IP**.

After the RPC2 is initialized, the IP address may be viewed on the RPC BDM. Proceed to **5.2.2 - Connect the RPC BDM to the RPC2 Communications Module** to connect the RPC2 communications module to the RPC BDM.

5.2.2 Connect the RPC BDM to the RPC2 Communications Module

To connect the RPC BDM to an RPC2 communications module:

- Connect one end of the factory-supplied Ethernet cable into the RPC BDM port.
- Connect the other end of the cable into the display port of the RPC2.

Once the PDU is turned On with these connections made, the RPC BDM is fully operational.

5.3 Placement of the RPC BDM™

The RPC BDM may be mounted in various locations inside a rack for easy access and viewing. It may also be hand-held and used as a portable device for connecting to different rack PDU's.

The unit may be rotated for vertical or horizontal display, as described in **5.1 - Orientation of the RPC BDM**.

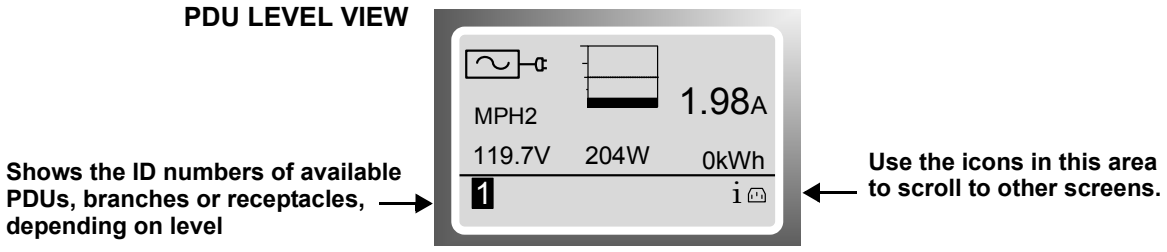
5.4 Navigation Tips

The RPC BDM has a scroll button for navigation (see **Figure 24**).

To navigate and select items:

- Use the scroll button to move the cursor to highlight an item on the screen.
- Depress the scroll button to select the highlighted item.

Figure 26 RPC BDM navigation icons



5.5 RPC BDM Operation

5.5.1 PDU, Branch and Receptacle Views Overview

The PDU Explorer hierarchy provides three levels for viewing Rack PDU data: PDU, branch and receptacle. The PDU level is the default view.

Figure 27 at right shows examples of the three views. For details on each view, see **5.6 - RPC BDM: PDU Explorer**.

- An icon in the top left corner identifies the component type—PDU, branch or receptacle.

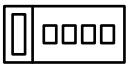
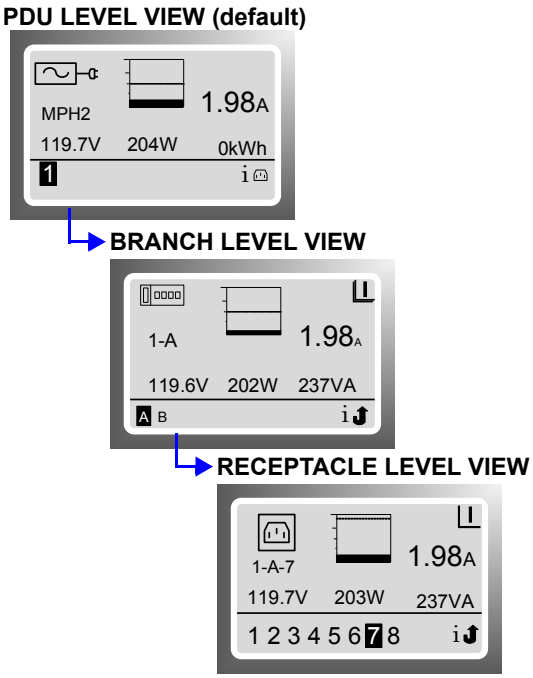
Level	Icon	Label in example shows:
PDU level		A Rack PDU with the user-assigned label *MPX1*
Branch level		Branch #3 on Rack PDU #1
Receptacle level		Receptacle #5 on Branch #3 of Rack PDU #1 (The receptacle image varies by type of receptacle on the rack PDU.)

Figure 27 RPC BDM views



- The highlighted ID number in the bottom left corner indicates which component is currently displayed—e.g., PDU #1, Branch #3, Receptacle #5. A selected component will blink while data about it is displayed.
- The component data includes a graph, amperage and status (V, W; VA for branch/receptacle).
- Navigation buttons appear in the bottom right corner of each screen.
- When any events are detected, the display changes to the PDU view and an Active Events icon appears at bottom right. See **5.5.3 - Viewing Active Events** for details.

5.5.2 Types of Data Available at PDU, Branch and Receptacle Levels

The following table shows the types of data available at each level.

Table 14 Monitoring data available on the RPC BDM via PDU Explorer

Data available	PDU	Branch	Receptacle
Graph of power utilization	✔ (each phase)	✔	✔
Amperage of selected module	✔ (each phase)	✔	✔
Voltage of selected module	✔	✔	✔
Wattage of selected module	✔	✔	✔
VA of selected module	—	✔	✔
State: On/Off	—	✔	✔

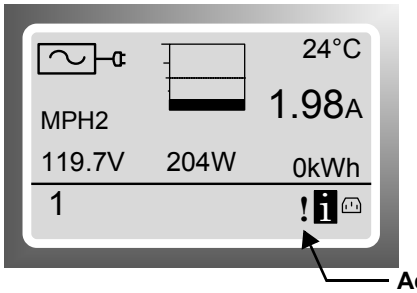
NOTE: Branch and Receptacle data may vary depending on the MPX BRM model and Liebert MPH™ capabilities.

5.5.3 Viewing Active Events

When an event is detected, the display switches to the PDU view with an Active Events icon in the bottom right corner of the screen, shown below left.

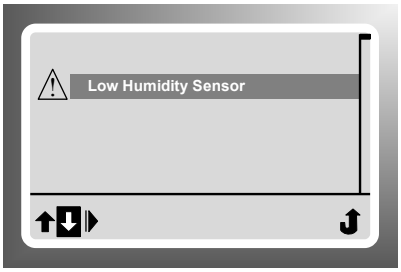
- Scroll to the Active Events icon (see below left), then press the scroll button to select it.
- The information view displays a list of events with icons to indicate severity (below right).
- To view details for any listed event, scroll to that event, then press the scroll button.

PDU View



Active Events Icon

Active Events



5.6 RPC BDM: PDU Explorer

The PDU Explorer uses a hierarchy to display data from connected equipment, starting with the PDU view at the highest level (default opening view), allowing users to browse down one level to view branches, then down another level to the receptacle view.

5.6.1 View PDU Data

To view data for a PDU:

- Select a PDU number in the bottom left corner. The selected number will be highlighted.
- The screen displays information for the selected PDU. The example below shows data for PDU #1, one of two PDUs that are communicating with the RPC BDM unit.
- The PDU view displays information collected at the PDU input point for each of the three input phases: L1, L2 and L3. Up to three phases may be used.
- See **Table 15** for explanations of components that appear on the screen.

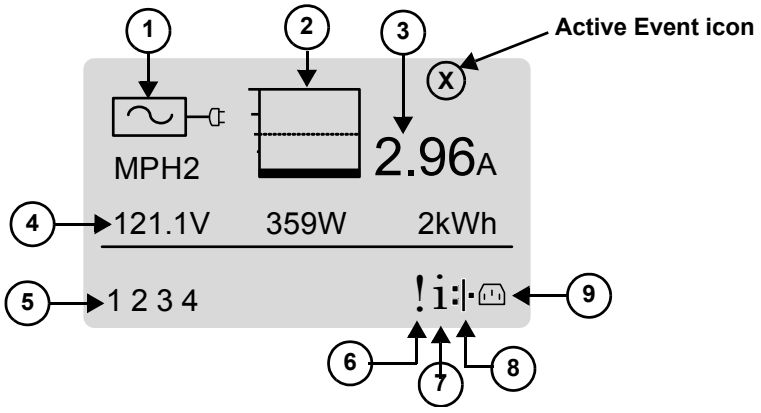
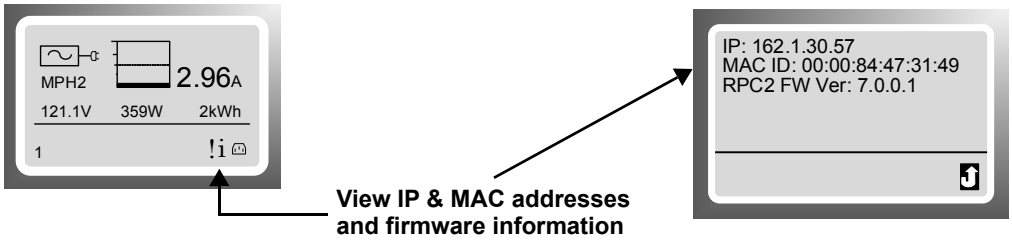


Table 15 PDU view components

#	Item	Item Description	Purpose
1		Component Identification	Displays an icon to indicate the type of component selected—PDU in this example—as well as the user-assigned name (e.g., MPX1).
2		Power Utilization Graph	Graphically displays the approximate power utilization of each input phase. The display automatically scrolls from phase to phase. The bar for the selected phase appears dark, with the input phase number displayed below the bar.
3	2.96A	Amperage	Displays the amperage of the selected phase.
4	119.7V 203W	Voltage, Total Power	Displays voltage of each line and total power for the selected PDU.
5	1 2 3 4	Rack PDU ID Number	Select a PDU to view its information.
6	!	Active Events	Go to a screen to view active events for the selected component. This button appears only when active events are detected.
7	i	Information*	Select to view ratings and serial number information for the Rack PDU and access screens providing temperature and IP address information. See example of PDU level information screen* below.
8		Network	Select to view other rack PDU's on the network.
9		Device Explorer	Select to view a list of user-assigned labels of receptacles. See **5.7 - RPC BDM: Receptacle Information** for more detail.

*** Example of PDU level information screen**



5.6.2 View Branch Data

The availability of branch information depends on the capabilities of the PDU. Branch information and PDU information are the same for rack PDU's without branch management; that information is seen at the PDU view level.

To view data for a branch module:

- Select a branch in the bottom left corner. The selected letter will be highlighted.
- The screen displays information for the selected branch module. The example below shows data for Branch A, one of two branches on PDU #1 that are communicating with the RPC BDM unit.
- See **Table 16** for explanations of components that appear on the screen.

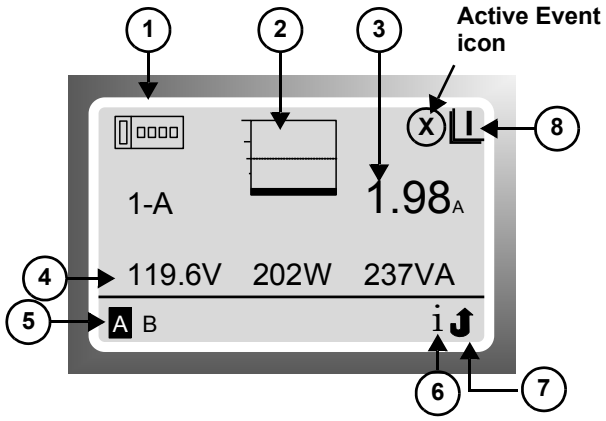
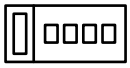
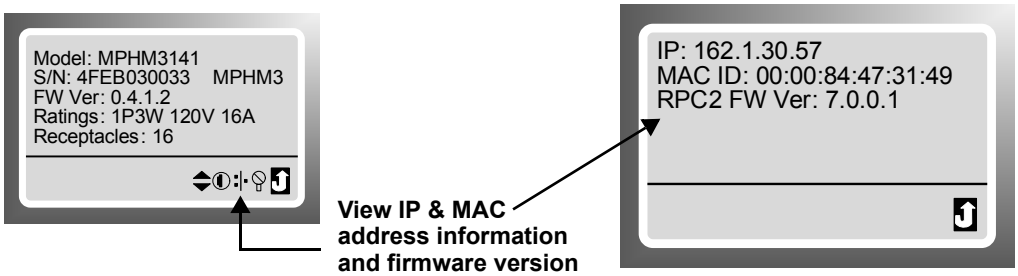


Table 16 Branch view components

#	Item	Item Description	Purpose
1		Component Identification	Displays an icon to indicate the type of component selected—branch in this example—as well as the branch ID, which is in the format: *PDU# - Branch#* (See **3.2 - Rack PDU Component ID** for details.)
2		Power Utilization Graph	Graphically displays the approximate power utilization of the selected components.
3	2.96A	Amperage	Displays the amperage of the selected module.
4	119.7V 203W	Voltage, Power, Apparent Power	Displays voltage, power and apparent power for the selected branch.
5	A B	Branch ID	Select a given branch to view its information.
6	i	Information*	Select to view information about the selected branch. See example of branch level information screen* below.
7		Up One Level	Move up one level—in this example, from branch to PDU view.
8		On/Off status	Displays an icon to indicate whether the module is On or Off.

*** Example of branch level information screen**



5.6.3 View Receptacle Data

The availability of receptacle information depends on the capabilities of the PDU.

To view data for a receptacle:

- Select a receptacle number in the bottom left corner. The selected number will be highlighted.
- The screen displays information for the selected receptacle. The example below shows data for Receptacle #7, one of eight receptacles on Branch #A of PDU #1 that are communicating with the RPC BDM unit.
- See **Table 17** for explanations of components that appear on the screen.
- A list of receptacles may be viewed (see **5.7 - RPC BDM: Receptacle Information** for details).

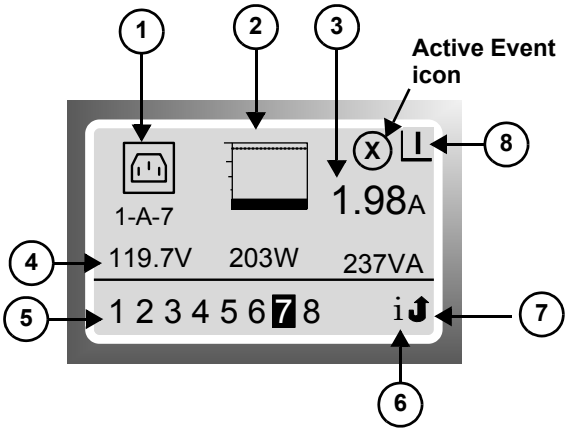
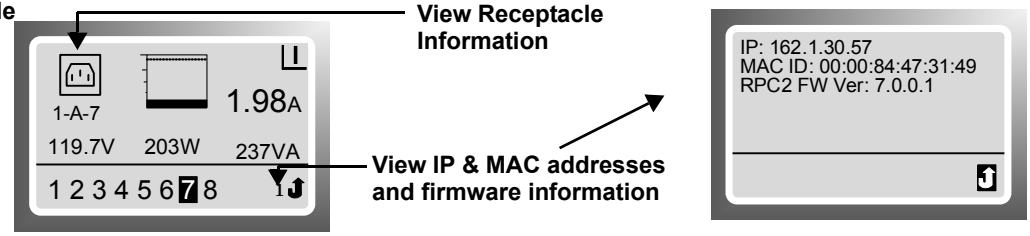


Table 17 Receptacle view components

#	Item	Item Description	Purpose
1	1-3-5	Component Identification	Displays an icon to indicate the type of component selected—receptacle in this example—as well as the receptacle ID, which is in the format: *PDU# - Branch# - Receptacle#* (See **3.2 - Rack PDU Component ID** for details.)
2		Power Utilization Graph	Graphically displays the approximate power utilization of the selected components.
3	8.33A	Amperage	Displays the amperage of the selected module.
4	120.3V 996W 9	Voltage, Power, Apparent Power	Displays voltage, power and apparent power for the selected receptacle.
5	1 2 3 4 5 6	Receptacle ID Letter	Select a given receptacle to view its information.
6		Information*	Select to view information about the selected receptacle. See example of receptacle level information screen* below.
7		Up One Level	Move up one level—in this example, from receptacle to branch view.
8		On/Off status	Displays an icon to indicate whether the module is On or Off .

*** Example of receptacle level information screen**

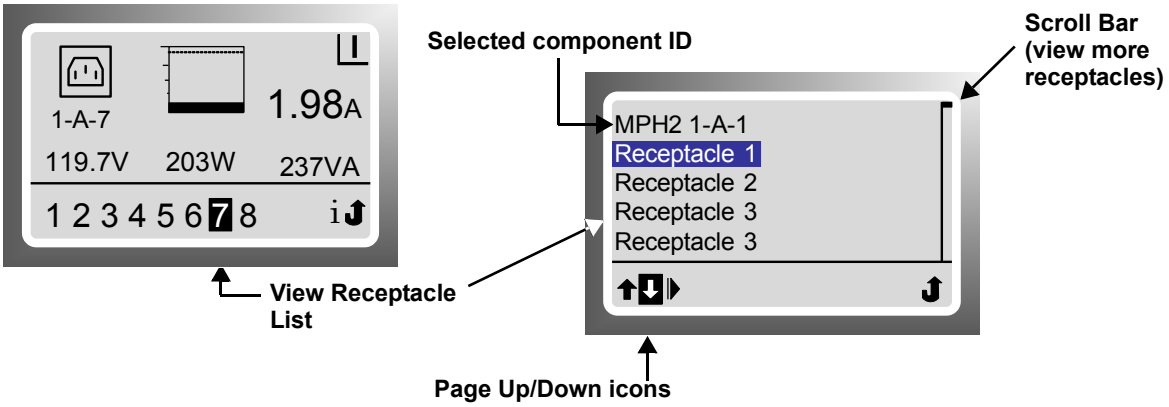


5.7 RPC BDM: Receptacle Information

The RPC BDM displays a list of all receptacles on a single rack PDU.

To access the receptacle list:

- Select the Information icon in the Receptacle view, shown below left.
- Select the Receptacle to be viewed, below right.



- Use the RPC BDM's scroll button to highlight a receptacle in the list. If a scroll bar appears on the right, use the Page Up and Page Down icons to display the rest of the list.
- Press the scroll button to select the highlighted receptacle.
- The screen displays the PDU Explorer view for the selected receptacle (see **5.6.3 - View Receptacle Data** for details).

6.0 LIEBERT SN™ SENSOR INSTALLATION (OPTIONAL)

The RPC2 is designed to monitor Liebert SN integrated and modular sensors.

- **Integrated sensors** are attached to a single cable. These Liebert SN sensors are available in several varieties, including single or multiple temperature sensors.
- **Modular sensors** are separate probes shipped with a cable for connection to the RPC2 communications module.
- Liebert SN sensors may be connected in a string, including a combination of modular and integrated sensors.
- The maximum string length is 65.6 ft. (20m).
- The maximum number of probes that may be connected to a Liebert MPH™ or Liebert MPX™ is 10. Refer also to the quick-start guides for integrated (SL-20840) and modular (SL-52405) sensors. See the sensor quick-start guides for details on the number of probes in each type of sensor.

Liebert SN sensors may be placed in any area—for example, in a Knurr® rack—to monitor conditions such as temperature and humidity levels or the state of a contact.

6.1 Introduction

Installing a sensor requires mounting the sensor, connecting it to Liebert monitoring equipment, confirming the change and configuring sensor parameters:

- **6.2 - Record the Sensor Address** - Write the addresses of all sensors on labels and in a log
- **6.3 - Mount the Sensor** - Mount the sensor securely in the appropriate location
- **6.4 - Connect the Sensor** - Attach the cable to the sensor port on the Liebert product
- **6.5 - Confirm the Module Change** - Acknowledge the sensor connection via the Web interface
- **6.6 - Configure the Sensor** - Configure parameters such as thresholds to trigger alarms

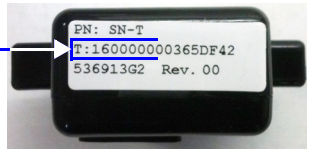
6.2 Record the Sensor Address

During configuration, the Web interface will display the addresses of all connected sensors. You will need to be able to identify which address belongs to each sensor.

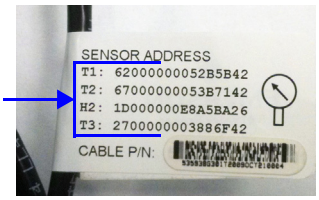
Be sure to make a note of each sensor's address before mounting and connecting sensors.

The sensor address can be found on the sensor itself (modular sensors) or the RJ45 end of the sensor cable (integrated sensors), shown in the examples at right.

MODULAR SENSOR
Address for one sensor:
1 temperature sensor (T)



INTEGRATED SENSOR
Addresses for four sensors:
3 temperature (T1, T2, T3)
1 humidity (H2)



6.3 Mount the Sensor

The sensor may be mounted in an Emerson rack or another type of rack.

For temperature and humidity sensors, be sure to choose a place with unobstructed airflow—for example, on the rack door. Check to make sure that the sensor does not cover any vents that might impede airflow.

Refer to the sensor quick-start guide for detailed instructions for each of the following four options:

- Mount on a Knurr rack frame or 19-inch rail
- Mount the sensor on the rack door
- Mount the sensor on a flat surface
- Mount the sensor on the rack rails

6.4 Connect the Sensor

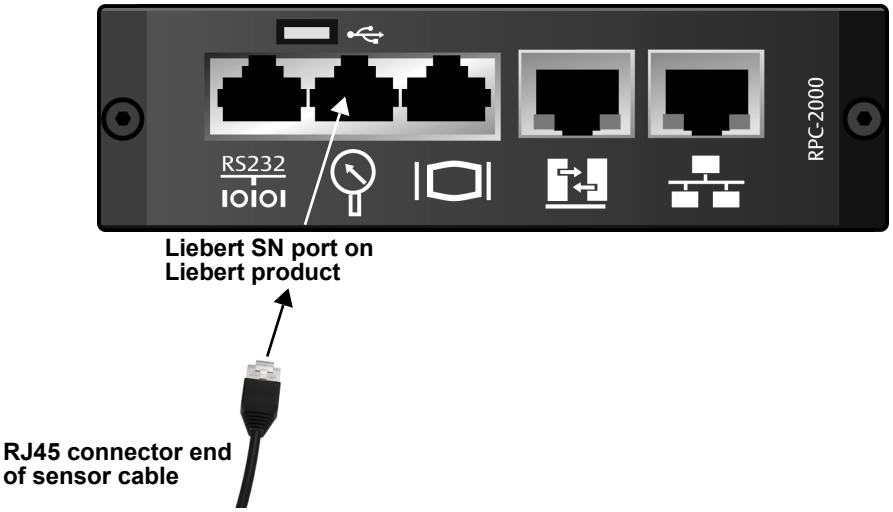
Each sensor is shipped with a cable to connect to the Liebert SN™ port on your Liebert product. The RPC2 (Rack PDU Card) must be installed before the sensor can be connected (see **2.0 - Installation** for more information).

To connect the sensor:

- After securely mounting the sensor (see **6.3 - Mount the Sensor**), determine the location of the Liebert SN port, identified by the icon shown below.

Icon	Description	Purpose
	Liebert SN Port	Use this port **ONLY** to plug in optional sensor accessories.

- Insert the RJ45 connector end of the sensor cable into the Liebert SN port on the Liebert product, as in the example shown below.



NOTE

When adding sensors to a string, disconnect the entire string from the sensor port and wait one minute, then reconnect the string to the port.

When the string is reconnected to the sensor port, all information will be retained for sensors existing in a string prior to adding the new sensor.

6.5 Confirm the Module Change

After connecting the sensor, you must acknowledge the change via the Web interface before the sensor may be monitored. You will need the sensor address recorded in **6.2 - Record the Sensor Address**.

First connect a laptop to the Web interface across an existing network connection:

- Login as Administrator
- Click on System tab, then Device Change in the left pane to display a list of PDU components that have been added or removed but not yet acknowledged.
- The viewing area in the right pane displays the following data.

Element	Description
Module Serial Number	Displays the serial number for each listed module. This is the sensor address recorded in **Section 6.2**.
Module Type	Indicates the kind of component—e.g., auxiliary sensor string.
Added	**Added** indicates a module has been connected to the PDU.
Removed	**Removed** indicates a module has been disconnected from the PDU.

- Module changes must be acknowledged before remote management is enabled or disabled. Click the **Acknowledge** icon (✔) for the changes to take effect.

NOTE

After a module is disconnected from the PDU and the change is acknowledged in the Device Change page of the System tab, the module's information is removed from the system.

If that same module is later reinstalled, it must be reconfigured as a new module. First, acknowledge the addition of the reconnected module in the Module Changes option of the Control tab, then make other configuration changes as needed.

6.6 Configure the Sensor

After connecting the sensor and acknowledging the change via the Web interface. Make changes as needed—for example, assign a label for the sensor and configure temperature or humidity thresholds to trigger warnings and alarms.

Changes must be acknowledged before they will take effect.

7.0 RPC2 COMMUNICATIONS MODULE ICONS

Icon	Description
	Save System OK Normal Operation
	Cancel/Alarm/Unacknowledged Change
	Abnormal Operation
	Reset Energy
	Enable Receptacle Power
	Disable Receptacle Power
	Cycle Receptacle Power
	Edit Edit Group
	Lock Receptacle
	Unlock Receptacle
	Blink Receptacle LED
	Synchromize Tiime Now
	Verify SMS
	Start Firmware Update

Icon	Description
	Download
	Export
	Flush
	Mixed State of Receptacles
	Open CLI
	Print
	Reboot
	Reset to Factory Default Setings
	Restore Configuration
	Save Configuration
	Verify SNMPv3 change
	Verify Email
	Edit Group-Receptacle
	Edit User

8.0 SPECIFICATIONS

Table 18 Electrical and physical specifications

Parameter	Limits
Voltage	7-12VDC
Power	4W Maximum
Operating Temperature Range, °F (°C)	41 to 140 (5 to +60)
Ambient Storage Temperature Range, °F (°C)	-4 to 140 (-20 to +60)
Relative Humidity	0% to 95% (non-condensing)
Maximum Operating Altitude, ft. (m)	6560 (2000)
Dimensions, WxDxH, in. (mm)	4.0 x 0.84 x 1.78 (101.6 x 21.3 x 45.2)

Table 19 Communication interfaces and agency approval

	Description
Communication Ports	
Ethernet	2 (one 10/100/1000Mbps Port; one 10/100Mbps Port)
I^2C	1 (Interface to the RPC BDM)
EIA562 RS-232	1 (Interface to Avocent Appliances)
1-Wire	1 (Interface to Liebert 1-Wire Sensors)
USB	1 (Reserved for Future Applications)
Safety Standards (Vary by Model and Region)	IEC 60950-1:2005 (Second Edition) + Amendment 1:2009 CSA C22.2 NO. 60950-1-07 (2nd Edition) + Amendment 1:2009 UL 60950-1 (2nd Edition) + Amendment 1:2009 IECEE CB Full Certification Scheme
EMC Standards (Vary by Model and Region)	FCC Class A, Part 15, Industrial EN55022:2006+A1:2007, Class A, Industrial EN55024:1998+A1:2001+A2:2003, Class A, Industrial IEC61000-3-2:2006, IEC61000-3-3:1995+A1:2001+A1:2005 IEC61000-4-2/3/4/5/6/8/11
Agency Approvals (Vary by Model and Region)	UL, cUL, CE, BG, CB, RoHS, REACH, WEEE

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